Published December 16 with Current News

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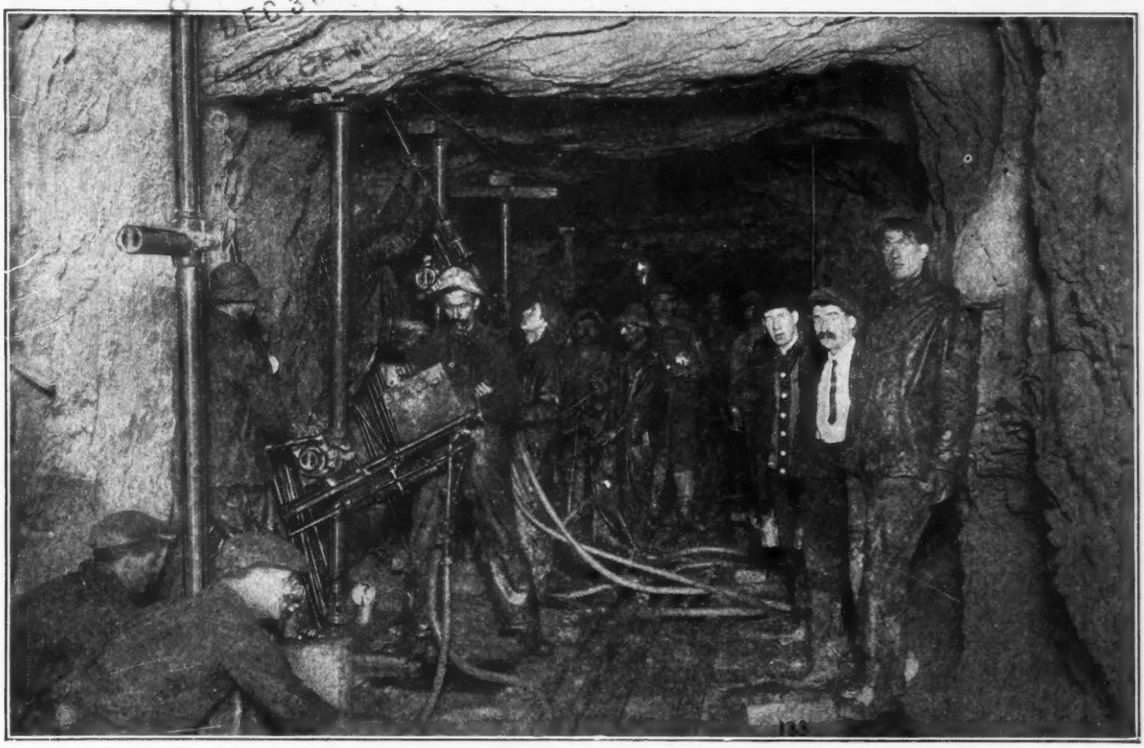
Engineering and Mining Journal

McGraw-Hill Co., Inc.
New York and San Francisco

Price, 20c.

November 22 and 29, 1919

DEC 3 1919



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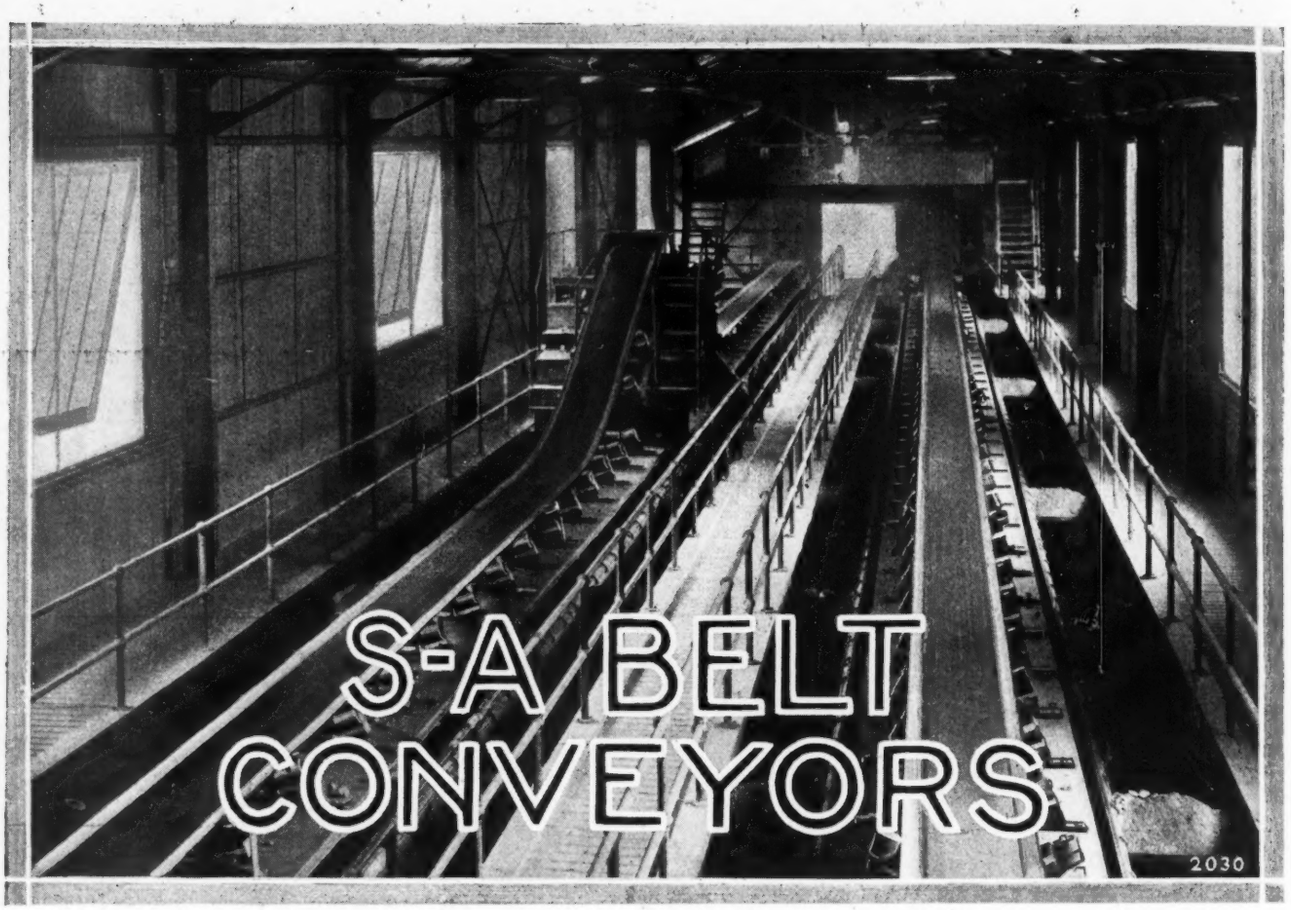

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Volume 108 | New York and San Francisco, November 22 and 29, 1919 | Number 20

The Armenian Mandate

"Then up spoke brave Horatius,
The Captain of the Gate:
To every man upon this earth
Death cometh soon or late;
And how can man die better
Than facing fearful odds
For the ashes of his fathers
And the temples of his gods?"

The Turkish Empire has long been known to contain considerable undeveloped mineral resources. Although it is one of the most ancient seats of civilization, modern mining and industry have not touched it. The Greek heroes smelted copper for their shields and helmets out of the small deposits which they found in the islands and near the bays round the Ægean Sea; and slaves worked gold-bearing gravels in Macedonia for Alexander the Great, to win metal for coinage which bears his effigy. In modern times Turkey has mined chiefly those mineral treasures which could be dug out without much skill and marketed without much preparation. Chromite produced around the Ægean Sea for long supplied the world and is still exported; and magnesite as well. Meerschaum has been principally produced from Asia Minor. A few silver-lead mines have been worked.

Judging from all reports the most considerable mine in Turkey is at Argana, near Diarbekr, where high-grade copper ore has been mined for many decades, smelted in charcoal furnaces, and freighted by camel to Alexandretta, to furnish the usual copper cooking utensils of the empire. Copper mines of less importance are known near the Black Sea coast, in Turkish Asia Minor, and in Armenia. Many plans have been formulated by the miners of our Western civilization to develop these ore deposits on a modern scale, and American enterprise has tried to solve the problem, but has been unable to make way against Turkish caution and the blocking strategy of European influence at Constantinople.

The situation has been changed as the result of the war. The German plot of a Pan-Islamic crusade to include India and give victorious Germany control of Western and Southern Asia was answered by England with the campaign of General Allenby up through Syria and Palestine, which resulted in the spectacular fall of Jerusalem. The French landed, after the war, at Alexandretta, at the northern end of Syria, and have established themselves thence in the Cilician rearland and beyond, well toward, if not up to the famous Argana mines. The Italians have seized the south and southwest coast of Asia Minor (Anatolia) as far northwest as Smyrna. North from the Italian holdings the Greeks have possessed themselves of the strip along the east coast of the Ægean Sea (Cydonia) northward to the region of the Dardanelles, and the Sea of Marmora, Constantinople, and the Bosphorus, which is held jointly by the Allied forces.

England recently made arrangements with Persia which establish a de facto British protectorate, guarding the great oil reserves of Persia and Mesopotamia, in the exploitation of which the British Government, itself, is the controlling partner. The French-held territory in Cilicia, to the west of the British-held territory, controls strategically the Argana copper deposits; and the Italian and Greek-held territories contain various deposits of chrome, magnesite, emery and other minerals.

Inland and to the north is the mountainous Anatolian plateau, peopled by Turks, and in the east inhabited by various semi-civilized Mohammedan hill tribes. In the northeast part of this territory lies Armenia, with part of the Black Sea coast, and Trebizond as the principal port. The Armenian territory is bordered on the south by regions populated by Turks and Kurds, on the west also by Turkish territory, on the east by the new-born and chaotic Mohammedan republic of Azerbajian, and on the north by the similar republics of Daghestan and Georgia, both Mohammedan. In other words, a Christian population is entirely surrounded by Mohammedans of an especially turbulent character. The Armenians of this region are, themselves, largely hill dwellers, and by no means of universally peaceful proclivities, and within Armenia are many Mohammedan villages, inhabited by Turks or Kurds. Part of the Armenian territory is now held by the so-called Armenian republic, a new state as wild and undisciplined as the neighboring Mohammedan republics, and with the same bolshevist tendencies. North of this group of four little republics lies the Caucasus, and beyond is that part of Russia held by Denikine's Cossack republic.

England has, up to now, held Batoum, and has occupied the mountainous rearland between Batoum and the Caspian Sea with about twenty-five thousand scattered troops which covered, in the Caucasus section, the territory of the Georgian and Azerbajian

republics. This territory she now finds it impossible to hold, and is withdrawing her troops, although it is not to be anticipated that she will definitely abandon the rich oil fields of Baku and the great manganese deposits of the region, unless through dire necessity. The principal manganese deposits are in the Georgian republic, formerly Russian territory; and lesser deposits in Armenia. In Armenia, also, is some copper, especially in the district of Zanghezur, where the principal deposits are reported to be British owned.

The territories now held by the various European powers to the south of Armenia and along the easily accessible portions of the Mediterranean coast will doubtless be retained indefinitely under a mandate by the nations now occupying them, if they are not formally annexed. The British newspapers speak of the Mesopotamian fields as theirs "by right of conquest," and both the French and English conceptions of the meaning of a mandate is that it is the equivalent of a strong protectorate. The Armenian territory is thus isolated, cut off from the Mediterranean and the Ægean by a Turkish no-man's land, which lies between it and the territory held by the European powers, and surrounded by a medley of swashbuckling Mohammedan races.

It has been seen that England finds the turbulent mountainous country of the Armenian republic and the wild republics between it and Russia impossible to hold, and she is very urgent that America take up her share of the white man's burden and assume the mandate over the Armenian territory. As may be surmised from the foregoing description, the region over which it is proposed that America accept the mandate offers another Balkan situation and is even more inaccessible and difficult. It must be held safely against the Turks, Circassians, Kurds and Georgians if the fair mineral and agricultural lands to the south, which have been seized by England, France, Italy, and Greece, are to be safeguarded. It is a true buffer state, moreover, between Russia on the north and British territory on the south. If England cannot police a portion of it with twenty-five thousand men, we may assume that it would require a considerable standing army of Americans. With America responsible for the holdings of this gateway between Russia and British-controlled Mesopotamia and Persia, she must become a party to every European difficulty, whether it involves England, France, Germany, Italy, Greece, Russia, Rumania, Bulgaria or Turkey.

The strategic desirability, as seen by the inveterate European diplomatists of having America hold this pass of Thermopolæ, is at once apparent. Moreover, let us consider England's great Mohammedan empire, now including India, Persia, Egypt, and Arabia. For England to be forever taking the part of Christian Armenia against the surrounding Mohammedan peoples would not make her control of this Mohammedan empire any easier; and the British Government would be the subject of constant attack from the church element at home. Should outrages against the Armenians take place under British domination, in what an unpleasant light would the government be placed! Nothing of that sort, of course, could happen under an American regime.

The plea for protection of the Armenian people is one that should be heard; but why, of all the Christian powers, only the United States can protect Armenia, is not clear; nor why the forces of the greatest fighting nation of the world should be withdrawn, pending the dispatch thither of our own boys. The situation is clearly nothing less than the result of a diplomatic move made by France and England—England, who as a result of this war has extended her flag over German Africa, Persia, Palestine and Mesopotamia, and much besides.

That our missionaries should second the propaganda of these powers simply bespeaks the guilelessness of these good people. If American interests in mining or other industries are also behind this movement, they are not fully appraised of the delicacy of the situation. Economic reasons underlie most territorial problems, the solutions of which are advocated on sentimental grounds, as witness Alsace-Lorraine and Silesia. Our Allies have most excellent economic reasons for nominating Uncle Sam to the heroic position assumed by the Captain of the Gate, Horatius, when he undertook to keep the bridge to Rome against all comers; but no adequate reason, economic or diplomatic, appears why Uncle Sam should accept this distinction.

Armenia, both in a physical and diplomatic sense, is a trap, and the situation is not changed by the proposition to extend the American mandate over all that portion of Turkey (including Armenia) not already occupied by one of our Allies. With the United States the mandatory of this whole territory, we would be the responsible keepers (for the benefit of the European powers, and at our own expense) of the gateway between Western Europe and Asia and Africa, as well as guardian of the buffer state between Russian and British territory. Not only would we be involved in the mad complexities of the Caucasian situation as above described, but the interminable quarrels of the European Balkans would be ours as well. It would be our duty to settle the fights between Greek, Bulgarian, Serbian, Bosnian, Rumanian, Turk, Albanian, Ukrainian and Russian, on the one hand, and of all the tribes of Western Asia on the other.

The guardianship of Armenia and of Turkey belongs to the European powers — at most liberal estimate, to the Allies jointly. Drawn into such an agreement, we should be a party to the quarrels of the world no less than the British, but without the corresponding territorial and commercial rewards. In such a position, moreover, our Monroe Doctrine would appear untenable. The Monroe Doctrine of the keeping away of European nations from the Western Hemisphere has always been associated with the principle of the United States keeping clear from European and Asiatic territorial entanglements; with the one gone it would be difficult to argue the other.

The Mining Congress at St. Louis

THE twenty-seventh annual meeting of the Mining Congress at St. Louis was noteworthy and successful. Efficient activity on the part of the management, and hospitality by the local authorities and residents, combined toward this result. Many addresses were delivered that were all worth traveling far to hear.

Primarily, the activities of the congress are devoted toward influencing legislation in Washington to protect the rights and further the interests of the mining industry. In its unreserved loyalty to the producing end of this industry, the congress might modify and adopt the inspiring sentiment attributed to Decatur: "Our country! May she always be right; but our country, right or wrong."

Broader questions and policies connected with the mining industry received especial consideration at this session, particularly the problem of radicalism, the relations of employer and employee, the railroad problem, taxation, and the coal strike. The League of Nations was tabooed as a purely political subject. And elevated and virile Americanism was conspicuous in the addresses and the spirit of the audiences. Radicalism in any form met no tolerance. There was manifested the fervor of 1776 and 1917. With the observer was left the comfortable feeling that here was a group of strong and representative men from all states and all walks of life who would stand as immovably in the way of the Russian-German tyranny called bolshevism as in 1917 they did against the Prussian tyranny of militarism, or as was done in 1776 against the bungling petty tyranny of the German-born king that sat on the throne of England.

Among many notable addresses was that of Governor Roberts of Tennessee, whose utterances were those of a strong, balanced, and just executive. He has cleaned bolshevism out of Tennessee, and calls on other states and municipalities to clean house similarly. The address of Charles A. Piez on the labor problem was fearless and sound, and deserves the wide publicity which we understand the congress will give it. He dissected dispassionately the attempted tyranny of labor unions; called for laws to compel the submission of grievances to a properly constituted tribunal, instead of striking; and offered the constructive suggestion that, as it was impracticable to force labor unions to incorporate against their will, a law should be passed to make any organization legally liable, whether organized or not, and so hold unions responsible for the immense losses they create in their present system of predatory economic warfare. We wonder if Congress can take its eye off the voter and re-election long enough to pass such patently equitable measures, or whether its members will continue their record of weak sisters in this regard, creating a favorite class so exempted from the law that it has not hesitated finally to defy the Government.

A most important function of the congress is that of the resolutions committee, composed of single representatives from each state represented at the congress. To this committee are referred resolutions introduced before the congress. The committee may kill these resolutions or may pass them as they stand, or in modified form, and such resolutions as it indorses are usually afterward indorsed by the delegates as a whole when submitted to them in one of the final gatherings.

The congress is not an exclusive organization. It represents a fair cross-section of the American people or of the mining (producing) industry, which is much the same thing. Here one may meet the mining engineer, owner, operator, and promoter, of all degrees; the superintendent or mine captain, the journalist, the stockbroker, the college professor, and the Government official, and not a few of the husky or horny-handed variety whom we love best. The inveterate collector will even find specimens of the common "mining shark and the shining mark." It is this wide representation that gives color, interest, and strength to the organization, and makes it democratic. Under an impeccable leadership, with an enthusiastic and attractive staff, this organization is equipped to have great influence, especially in Congress, and to get results. The presence of many eminent mining engineers, as well as the heads of the Geological Survey and the Bureau of Mines, was a recognition of the useful and strong position which the congress occupies; and we bespeak for it still greater attention and support. We may not always agree with the conclusions of the congress, or the views of its staff; but we like it and them.

One of the things on which we differ is in regard to what we understand to be the congress' present attitude in respect to Federal blue-sky legislation, designed to prevent the operations of dishonest promoters and peddlers of stocks. This session of the Mining Congress failed to pass a resolution which had been submitted favoring such legislation. Of the twenty-two resolutions which were finally adopted, however, we believe that most will meet the approval of the whole mining industry; and the rest will crystallize live topics into subjects for debate.

The Man Hoover

AT THE recent dinner of the Rocky Mountain Club in New York, many distinguished men sat on the elevated platform which at once enabled them to view the other diners and the diners to observe them. It was well worth a man's time to study this living picture, as they sat, reflective and genuinely sorrowful, at the birthday anniversary of their great compatriot—Roosevelt. On faces seasoned by years could be read the frank and adventurous spirit of John Hays Hammond, the benign and solid manhood of Judge Alton B. Parker, the saddened philanthropy and optimism of Ambassador Jusserand, and many others. Two personalities stood out most plainly—the commanding and active mentality of Roosevelt's Secretary of State, Elihu B. Root, and the impassive presence of the mining engineer, Herbert Hoover.

"The first citizen of New York" lived in the past, his mind brooding, his eyes snapping, his features

mobile as he followed the course of the dinner proceedings, or, on his feet, with concentrated effort, sought to make his audience sense his own feelings regarding his beloved chief. On Hoover's face, quiet to stoicism, was graven the same shadows as those on the countenance of Jusserand—the sadness of men who have lived with and striven in behalf of a horribly wronged humanity, whose pain they could only slightly alleviate, and whose call has reduced their measure of their own personalities to the stature in which the Maker views them. It was with Hoover the spirit of the present and the future, brooding, thoughtful, and determined. Hoover's speech, read from notes, had the quality of a carefully reasoned mining report, and was delivered in the same conscientious and unrhetorical spirit.

A most trying time for those Americans who have performed a conspicuous public service is the applause, hand shaking, and seven-day glorification of them as heroes and supermen. Worthy and great men have foundered or been damaged on these rocks. It is our impression that Hoover has not experienced to any great degree the natural pleasure of standing in this warm though transitory sunshine, nor expanded in response.

A just appreciation of a man is difficult for his contemporaries. We have seen an autograph letter of Horace Greeley's, written during the Civil War, in which he lamented to a friend the weakness and inadequacy of Abraham Lincoln. Today no orator hesitates to group Lincoln with Washington. The tendency of the age is to complete the group as a trio, and various third members have been proposed. At the Roosevelt dinner the dead President was so rated, and none will deny the place in history of that simple and heroic figure, whose part in the Great War was limited "malgre lui," as he pathetically wrote to Jusserand. As to the active personalities of the war, history and posterity will decide; but no figure in America stands out to our imagination like that of the mining engineer Hoover, a man neither elected nor appointed to his mission, who rose above the sea of obstacles and opportunities by his own strength and natural buoyancy, who handled matters of business and state of world importance—and held his peace about the rest.

The rest of us, who are eternally busying ourselves about other people's shortcomings and duties, are wondering, among other things, "What will Hoover do?" The obvious and usual thing will be for him to accept the presidency of some great corporation, become a power in Big Business, a captain of industry, and so pass on. Our guess and belief is that he will not do this. Having given so much of his vital force to America and the world without the ordinary recompense, he must give the rest. Abilities such as his are not private property, but belong to the commonwealth.

There is much talk of Hoover as President, and there is no one we can think of that we would rather see in the Executive chair; but the position of this, in view of all the machinery of party and politics, seems very doubtful. In making his decision doubtless there will occur to our miner the example of Roosevelt himself, who, when he had once dedicated himself to public work, took up with energy whatever labor of that type came to him, whether it were small or large.

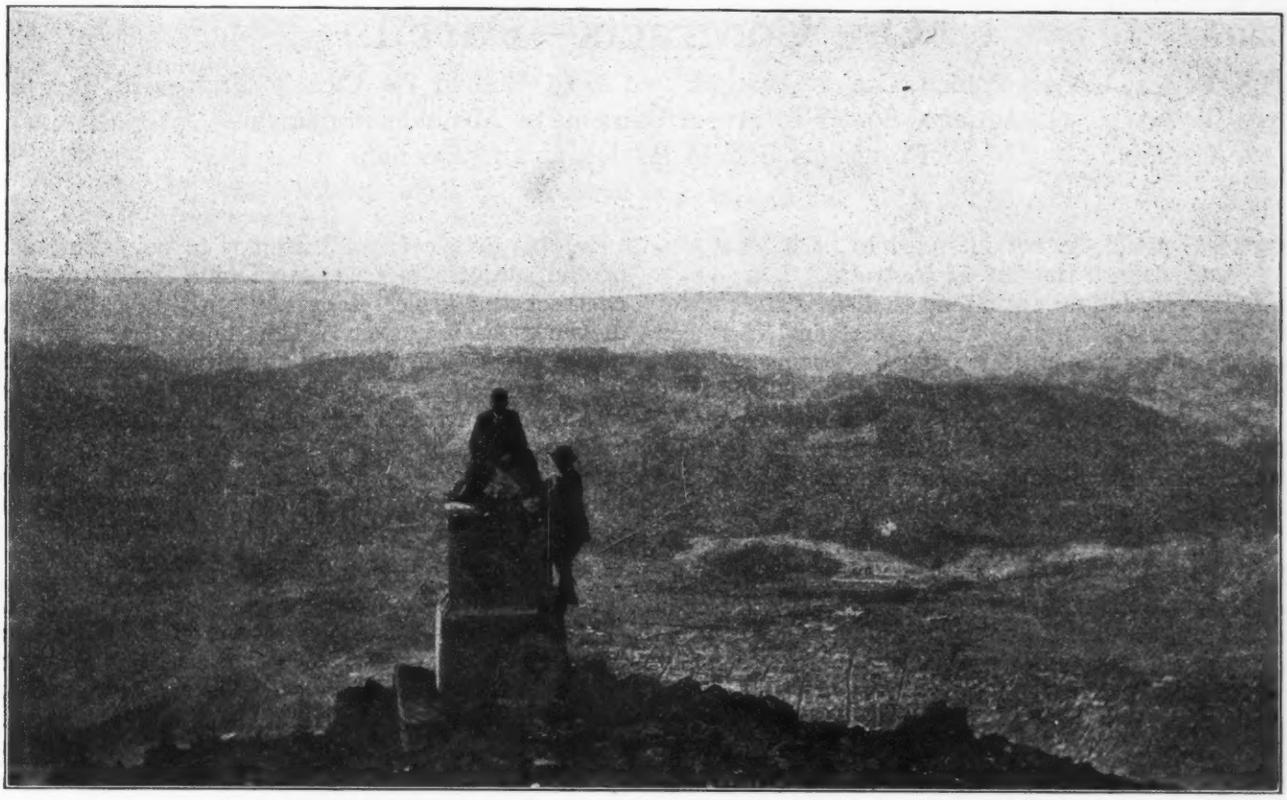
Power for Prospecting Plants

THOUGH the use of hand methods for drilling in the work of prospecting, as well as the hand windlass for hoisting, will continue indefinitely as convenient and simple, requiring the minimum of equipment, modern prospecting often makes use of power for these two important operations. Compressed air is invariably used in drilling where it is obtainable. It can also be used for hoisting, and for this operation air hoists of convenient size and adaptability are afforded by the machinery market. If electric power is available from hydro-electric lines, or from a central power plant, electricity is in most instances the most convenient power agent to use for driving the compressor. It is also used for hoisting, and is more economical than a compressed air driven hoist.

If it is necessary to generate power, there is considerable latitude of selection. Steam power for hoisting and air compression is simple and effective, and results in a compact plant. Fuel is the vital question. With cheap and easily procured fuel the steam plant is a good arrangement. In the absence of fuel or where fuel costs are high, the internal-combustion engine is the next possibility. The advantage of this form of primary power is the relatively small consumption of gasoline, distillate, or fuel oil per power unit generated. This important fact is vital in transportation and storage. Gasoline and distillate engines have been used for prospecting plants, both for hoist operation and for driving air compressors. It is doubtful whether they have been entirely satisfactory.

The semi-Diesel engine is less complicated and is successful to a high degree. We believe that it is deserving of greater attention from the mining field and that it is well worth the attention of engineers who have the selection of mechanical equipment for prospecting plants. In this issue we present a short descriptive article on a tandem type of semi-Diesel driven air compressor which indicates the progress made in manufacturing power machinery suitable for the small mine and prospect.

THE growth of the Journal calls for an expansion of its staff, which is already so adequate that it has been divided between New York and San Francisco without interfering with efficiency at either end. We should like applications for the position of an editor to take especial charge of our petroleum section and another to take special charge of the non-metallic mining section, which we purpose introducing as soon as present mechanical difficulties have been passed. Applications should be addressed to the New York office.



SUMMIT OF FAMOUS POTOSI HILL; CITY OF POTOSI BELOW

Photographs From the Field

FAMOUS POTOSI HILL, POTOSI, BOLIVIA. ALTITUDE, 16,001 FT.

Ore Contracts—Part I.

The Terms Under Which Ore is Bought and Sold Should Be Clearly Expressed in Plain Language, So As to Avoid Subsequent Misunderstandings— Provisions Should Be Legal and Friendly

BY C. A. GRABILL

THIS article is not intended to be a legal disquisition on the law of contracts. I am not a lawyer, and do not intend to discuss the matter from the legal standpoint. A great deal has been written about the subject, from the business standpoint, and there have even been several legislative investigations, notably one in Colorado a couple of years ago; but it seems to me that something may still be said that is both relevant and material to the subject.

The first question is: What is an ore contract? To my mind it should be a memorandum of friendly agreement setting forth as plainly as possible, and as simply, the terms under which one of the parties signing will buy and the other sell the ore which is the subject matter of the agreement, the terms being allowable under the statutes and legally stated in accordance therewith in such manner as to avoid subsequent dispute as far as may be. Unfortunately, these agreements are not always friendly, and sometimes one party tries to slip something over on the other; and they are not always clearly stated, and the unforeseen happens — hence the disagreements and lawsuits.

With reference to one of the latter, I was once told by an authority that no contract was ever written that did not contain loopholes big enough to drive a team of horses through. This is stating the matter in somewhat stronger fashion than I think it deserves; nevertheless, one of the most important points of any contract is the character and integrity of the signers. Still, it is also well to know the reason for, and the meaning of, the various clauses, and also of those clauses which for one reason or another have not been put in writing, for there invariably are such, the interpretation of which subsequently will depend on custom, argument, or the court.

The complaints usually made against ore contracts are that they are too complex. This applies not only to the long and complete contracts covering large amounts for a term of years, but also to the comparatively simple schedules issued by various companies for the purchase of ore in the open market without definite contract. The latter, however, contain such statements as "as usual," or "in accordance with the custom," or similar phrases, that really cover large parts of the more formal contracts, and are accepted by the sellers, usually without question though sometimes with more or less grumbling. I am not referring here to some of the lead schedules such as are reported by the Colorado Commission, which are not only complex but foolishly and indefensibly so.

In this article I shall attempt to point out most of the subjects to be covered in a fairly complete contract and typical schedule, with an explanation of the more important. The full contract form is much longer than many of those in general use. In fact, one company on the Pacific Coast does not make any contracts, but simply issues a schedule of prices subject to change on notice. On the other hand, another company endeavors to tie up all shippers by a definite formal contract as far as they have desirable ores, buying only the small and more or less undesirable lots on open prices.

All this brings up the second question: Why any contract at all? There are two very different classes of reasons: the first is concerned with matters of policy and the second merely with the setting forth of the terms in a way to avoid later disagreements or trouble.

One of the reasons of the first class may be that the buyer is willing to offer a rate so favorable to the seller that the former will make no immediate profit, expecting to recoup through the development of more or better ore in the seller's property. In this case his only protection is a long-term contract which will prevent the sale of the better ore to competitors when found. The same thing will apply if the buyer wishes to aid the development of a property by a loan. Another, and perhaps the most important of all, is that the buyer is assured of a steady supply of ore of more or less definite character on which he can base his operations, and from time to time he can take advantages of opportunities to contract other ores complementing the first and extending his operations under terms more favorable to himself, or to the shipper, as the case may warrant, than if buying in the open market from hand to mouth.

Smelting companies, and especially commission agents (who are gradually disappearing), are not charitable associations, and the buyer may wish to take advantage of the temporary condition of the market to make a contract for a term of years at better than the average price, or to take advantage of the temporary or immediate lack of competition to tie up the ore supplies so that competitors can not enter the field, or merely to grab everything in sight.

Conversely I have never seen any shippers that were willing to contribute to the welfare of the buyer any more than was absolutely necessary, and they frequently take advantage of similar conditions in their favor. Generally, however, the important factor in their case is the same as in the buyer's; that is, the possession of a constant market with

conditions as fixed as possible on which operations may be based.

The seller has nothing to limit his efforts to beat down the smelter tariffs, but the buyer—smelter, mill, or agency—is always faced by the goose-and-golden egg proposition; that is, the lower the amount paid for ore, the less tonnage available, or the greater the profits per ton, the less tons on which to profit. This is a very real limitation and constitutes a reason for the frequent aid extended to shippers in the way of advances, and also for many of the terms and complexities of the schedules, as will be seen later.

Now comes the question: Why the complexity? The authority previously quoted also said that the shorter and simpler a contract is, the better it is. Though not approving the complex schedules previously referred to, I do not agree with this statement, unless the shorter form covers the same points as the other, and even then I have my doubts. If it is true, a flat rate and simple statement of sale would be all that is required. The use of the Jackson Price in Chile was an attempt to do this, but the results are not satisfactory, and a great many things are done "in accordance with the custom" that subsequently cause dispute or trouble.

Anyone who has had the patience to read this article is probably a potential shipper. For the sake of argument let us assume that you are a buyer and that I wish to sell you some ore from Timbuctoo, or from an undeveloped mine. Do you wish to purchase it at a flat price? I think not! First we must ascertain how much valuable metal it contains, and how much of each metal, if more than one, and agree on a method of determining the price in these days of violent fluctuations, and a treatment charge to cover your expenses, and deductions for what you expect to lose, and all the rest of the things that make up the schedule. Omitting consideration of all these details, and assuming that the schedule is agreed upon, are we all right? Far from it. Where is the ore to be when the price is paid? Presumably at the buyer's plant, but not necessarily so. If so, and delivery is by railroad, who pays for the unloading? Supposing you are asked for an advance, to be protected by the ore in transit, and it is lost in transit. Who loses? Who loses if the advance is protected by a bill of sale and the shipper fails to take out insurance or send advice of shipment in time to permit it to be done? If the shipper pays for unloading, who pays for demurrage? Taxes? Who pays them, and what about new taxies levied during the period of liquidation or treatment of the ore?

There are about a thousand of these questions, most of which can be answered definitely by a well-written contract form. Of course, many of them are answered by the statutes covering the case, or by the common law, but many are not, and a well-written form will save much annoyance, not to say grief, later.

It may appear to the reader that there are too many of these questions to be answered, but it must be remembered that most of them are important only if left unanswered. It makes little difference whether the shipper pays the freight or the buyer does it. The freight has to be paid, and if the buyer pays it he will simply put it in the treatment charge or as a deduction, probably with a little additional charge for his trouble.

In general, little argument need be wasted on the preliminaries, only noting them and their effect on the schedule, which is the main question at issue, and to which real study should be given, not only as a means of determining how much the seller is to receive for his ore but to see that it is so arranged as to encourage the production of that grade and class of ore which will result in the greatest profit to both parties. This is a most important part, frequently neglected. I refer to this again when discussing the schedule.

The comparatively minor importance of the preliminaries, except in a few special cases, accounts for the blank forms used by some companies, but they frequently omit important things, though rarely intentionally, and often from oversight. A contract form prepared by a buyer or association of buyers will not ordinarily give special attention to the protection of the seller's interests. But if the form is complete the seller has ample opportunity to study its effect on the main question before settling that.

In the British shipping industry the forms have crystallized into the well-known "charter parties," with their ancient phraseology, each clause of which has been clearly defined by court decisions for many years. In the United States the preliminary and final clauses usually follow a fixed form of words, for the same reason. In Spanish America the civil codes prescribe certain requirements for a contract and certain civil attributes that the contracting parties must possess. The former, such as the date, place, signers' names, and language, simply appear as part of the contract, but it is customary to set forth the latter in the opening paragraph. This is not always essential, but if not done, proof that both parties had the necessary qualifications becomes the first thing in any subsequent court procedure, and it is probably best to follow the customary form.

All these matters of form being cleared away, most of the points to be covered may be grouped under the following headings:

1. Date of contract and time element.
2. Source of the ore.
3. Character and classification of the ore.
4. Tonnage involved.
5. Place of delivery.
6. Shipping expenses and responsibilities.
7. Weights.
8. Sampling.
9. Moisture.
10. Assaying.
11. Comparison of assays and splitting limits.
12. Umpires.

13. Shipper's representative.
14. Schedule of payments and deductions.
15. Quotations.
16. Exchange.
17. Taxes.
18. Advances.
19. Liquidations and settlements.
20. Manner and place of payments.
21. Deleterious substances—see schedule.
22. No payments to be made for things not provided for.
23. Force majeure.
24. Penalties, special clauses, etc.

This forms a fairly good list, but several of the items, particularly 3, 6, and 14, are capable of considerable expansion, though most are simple and nearly all are capable of being covered by standard forms. Omitting consideration of No. 14 until the last, they will be taken up in order as follows:

1. Date of Contract

This clause should state the date of the beginning of the contract, and, if possible, the time of its duration or termination. If there is no definite period of duration, the method of termination should be given. Contracts are of two types: time contracts, for a definite period or until cancelled by one or the other of the contracting parties, and tonnage contracts, for the sale of a definite number of tons. In the case of tonnage contracts, time limits are often inserted. Frequently contracts are made for short or trial periods, with the option of extension, on due notice or before a certain date. Care should be taken that the time and manner of giving this notice is clearly stated, and similarly if cancellation is provided for. Mines are not like quarries, and if a miner contracts to deliver 100,000 tons of ore, and conditions change, it is just as well to be sure that the contract provides some method for its cancellation if he finds that he can produce only 1,000 tons per year; otherwise his grandchildren may have a whack at it.

2. Source of the Ore

It is customary to specify from what mine, or group, ore may be taken for sale under the contract. If this is not done, a contract may be offered to the owner of a mine producing ore of a kind particularly desired by the buyer, and the owner may subsequently acquire another property producing similar ore but lacking the characteristics which made the other desirable, or the owner may have been offered an extremely favorable rate in order to induce development of a new low-grade deposit, and later acquire an old high-grade shipper, expecting in perfect good faith to dispose of the ore under his favorable contract. Two ores of similar composition chemically may be of such different structure physically that they will yield entirely different results on treatment. It behooves both parties to the contract to understand clearly its limits as to the intended source of the ore.

3. Classification of the Ore

Similarly, the contract should specify whether the ores receivable under it are run-of-mine, coarse, or fine, screenings, concentrates, dump ore, or other product alone or mixed. This may seem at first sight unnecessary, but it is difficult to make a schedule cover everything. The shipper may be calculating his expenses, on the basis that he can screen his dump, obtain a product profitable under the terms of the contract, mix it with the mine ore, and profit by the reduced "overhead." The smelter refuses to receive the screenings, on the ground that they are not ore, and the shipper finds himself "stuck." Or the smelter may have offered a schedule with a 10 per cent free limit for zinc, on the understanding that the mine ore averaged 5 per cent Zn, varying from 2 to 10 per cent. The shipper finds that he can work the dump and obtain a high zinc product previously rejected. By mixing it with the mine ore he obtains a product within the terms of the contract but containing 10 per cent Zn, thus defeating the intent of the contract.

The contract should also specify what classes of ore are intended to be included in the agreement, that is, silver, gold, copper, lead, sulphide, oxide, or other, and define their limits. A recent failure to do this came to my attention. An ore buyer had offered a contract for the product of a certain mine known to produce copper ore, with little gold and silver. The treatment charge was made nominal, it being the intention to take the profits in the form of deductions from the price paid for copper. The miner, considering the low treatment, found that he could work a silver vein on the property previously unworkable, and proceeded to ship a carload of the ore under the contract. There were no copper deductions, and the ore could be treated only at a loss. If the two were mixed when did the copper ore cease to become copper ore? If it was copper ore at 2 per cent, was it at 1 per cent or at one-half of 1 per cent? Classes should be defined and limited, for the protection of both parties, or else the schedule should be arranged to cover the whole thing, which can be done but is not always convenient. In this case, if the limit is made 2 per cent, is there any reason why the shipper should not mix his 5 per cent ore with the silver ore until the combined product is about 2.1 per cent or go to a neighbor and buy a little copper ore if necessary? Not unless there is an understanding to the contrary, and understandings are poor things. It is better to write it into the contract.

In this case things could have been arranged in several ways. One would have been by making a nominal deduction from the copper price and increasing the treatment charge. The objection was twofold. To make the profit proportional to the money invested would have required a sliding treatment charge, which would have been more complicated and was particularly not desired. The expense of treating this ore was high, and the psychological effect of the high charge would have been to induce the seller to go to a competitor, even under equal conditions. Another method would have been to

leave the terms as they were and to provide for the payment of a correspondingly low portion of the silver, say 75 per cent, instead of the customary amount. Then, no matter in what proportion the silver ore might be mixed with the copper ore, the result would be the same. The objection is again partly real and partly psychological. The first is that occurrence of silver in the copper was quite possible and would have resulted in unjustifiable profits by the buyer and complaint by the shipper. The second was that the mining world has become so accustomed to expect a payment of 95 per cent or thereabouts that the payment of the lower percentage would have caused the shipper to think an attempt was being made to rob him, and he would have sought a competing buyer, even on more unfavorable terms, which were not evidently so.

4. Tonnage

The contract should state whether the total production of the mine is to be delivered, or only a limited tonnage, and if a limited tonnage, how much, and at what rate of delivery. Thus it may cover the whole output for five years, with a minimum and maximum per month, or a total of, say, one hundred thousand tons, but not to exceed three thousand tons per month, with the proviso that should the shipments be less than "x" tons per month for "y" consecutive months, the buyer may cancel, or a penalty may be attached. (N. B. There is a legal technicality to be watched.) In either case provision should be made to permit the shipper to dispose of his excess or low-grade tonnage in such manner as he may desire. Provision is frequently made to give the buyer first chance to buy it, terms being equal.

The limit is placed to prevent overwhelming of the small plants in times of high prices and also to prevent speculation in metal prices at the buyers' expense. Owing to the effect of high prices in increasing ore deliveries, falling off of shipments in times of low prices, and the inelasticity of smelting plants, reduction works frequently fail to receive as much for their metals as they pay. This is referred to again in connection with the deductions from the price of copper in discussing the schedule.

5. Delivery

It would seem that a simple statement that the ore should be delivered to the buyer's place of business would be sufficient. Sometimes the buyer shuts down a plant or has a surplus of ore, or for some other reason wishes to divert the ore to another plant and transfer his contract. For this reason the contract contains a clause to the effect that the buyer may demand delivery at some other point than that specified, on condition that any increased expense of shipment is for the buyer's account.

6. Freight

It would also seem as if the case of shipments from points near at hand would not require any statement other than that of the delivery place, but there is still the question as to who will pay unloading charges, demurrage at the buyer's plant for which the buyer may or may not be responsible, routing and releasing to fixed valuations, insurance and penalties for violations of railroad regulations, and diversion to other delivery points, all of which may have considerable importance if advances are made before, or on advice of, shipment, or if the ore is bought at some intermediate place. And if the shipment is from some such place as Bolivia to New York, via Antofagasta, Chile, New York prices and weights to govern, and advances, consular invoices, customs dues, lighterage, port charges, exchange, interest, commissions, sacking and resacking, losses in transit, differences in weights, all in two languages, and two systems of weights and measures and three or four currencies enter into the question, then the bookkeeper is in for a busy afternoon.

7. Weights

The weights that govern are usually the buyer's receiving weights taken in the presence of the shipper's representative, but sometimes vice versa. If outside of the United States, it should be stated whether metric or other systems of weights are intended, and, particularly, the ton should be defined. I recall one contract that used four different kinds of tons. They were the metric ton, the ordinary short avoirdupois ton of 2,000 lb., the long ton of 2,240 lb., and a special arbitrary ton of 1,030 kilos. I think it a good plan to always spell the word "tonne" when referring to 1,000 kilos.

8. Sampling

The clause covering this usually reads "in accordance with the usual practice," or something similar, and it ought to be more definite. In the case of large shippers it is not practicable to hold the whole lot for resample in case of disagreement, and provision should be made for cutting a first sample by hand or machine which can be held for resample if desired. There must be enough sealed pulps (samples for final assay). The buyer requires one, the shipper one and sometimes two, and then there are the control, umpire, and one or two reserves in case of damage or loss to the others—six or eight in all. An intermediate sample is frequently cut, sacked, and sealed for reference or use in case of accident or error in the final sample. The presence of the buyer or his representative at all sampling operations is always provided for.

Excepting a few irresponsible ore buyers, it is fairly safe to assume that the buyer is going to try for an accurate sample, but in the case of smelters treating the ore in blast furnaces, there is a clashing of interests in the buyer's own domain. Good sampling requires fine crushing. Good blast-furnace operation requires coarse ore. It may therefore be seen that the smelter who treats the ore in blast furnaces will not crush the ore any more than is necessary, and, in order to keep down costs, may even be willing to take a chance on the self-correction in a number of errors. Now, the values in an ore are not usually the same in both coarse and fines, but may be greater in either one. In either case it is

necessary to watch that sample and reject carry their due proportion of both. There is no doubt that the sample taken from well-mixed fine ore will be better than that from coarse ore, no matter how taken.

Handbooks give the limits to which the different classes of ore should be crushed before cutting in each step of the process, but they are often neglected. They are based on the effect that one extra particle of maximum size will have on the sample if it should consist of the richest ore in the lot, and the tables can readily be calculated if not at hand. In the case of ore containing free gold, the figures are rather startling to the uninitiated.

9. Moisture

The moisture determination is, I believe, the most unsatisfactory detail of the whole business. In most contracts the clause referring to moisture merely says that there will be a minimum deduction of 1 per cent for moisture. This is supposed to cover the dusting loss in dry ores, and I believe it to be fair. In Chile operators used to have a custom of making no moisture determination at all. The sample was cut down, bucked, and assayed without more ado and supposed to represent the ore pile without further question. This was all very well around Antofagasta, where it rains once in ten years, or at Iquique, where it never rains at all, but when it comes to ores from Concepcion, where it rains all the time, the matter bore quite a different aspect, because the process of bucking the sample will partially dry it; in fact, the ore will not pass the screen until fairly well dried, and the sample then indicated more value in the ore than it actually contained.

But how is the moisture to be determined? It is the custom to take a small sample at the time of weighing the ore, weigh out from one to three pounds and dry them in a steam room until no further loss of weight takes place, usually from twenty-four to thirty-six hours. But in the case of a carload consisting of fine ore and boulders of from 10 to 400 pounds each, no one can tell me that the sample is accurate. Furthermore, in climates like Arizona there may be a thin layer of dry ore on the surface and a wet interior, or in the rainy season conditions may be reversed, and I have known of one enterprising shipper, who observing that the smelter people were in the habit of opening up the middle of the carload and excavating a short way towards the ends until a representative face was opened up, and then taking the moisture sample there, conceived the bright idea of turning the hose on the ore in the ends of the car while loading. I hate to tell what the moisture was on the sample taken from the next car after this appeared, but I believe the practice stopped.

It is not practicable to wait until the car is unloaded and crushed to take the sample, as it may dry out appreciably, and the same thing happens if a large sample is taken and put through a crusher. A small sample will dry on its way to the testing room if not placed in a non-absorbent and covered container; otherwise, a tin pail. The moisture is usually in the fines to a greater extent than in the coarse material, and the tendency is always to take too great a portion of fines. But if the ore comes from a wet mine in a dry climate the fines may dry out in shipping and the interior of the large pieces remain wet. The best thing that can be done practically is to take a fairly large sample, breaking up a few of the larger lumps with a hammer and dry about ten pounds on steam plates or coils in a steam room with constant circulation of air. Steam-heated air baths, with constant circulation of heated air, held at a fixed temperature are better, though rather more expensive to install.

There is one kind of ore that should be watched for as it invariably causes disagreement. This is ore containing combined water such as the zeolites, gypsum, and like materials. They are not uncommon in the Southwest and may contain as much as 14 per cent of water and still be dry and dusty. These ores will sometimes reasorb water after drying on the steam bath. In this case the samples for assay should be dried under the same conditions as the moisture sample and sealed in glass bottles, or else the sample packet should be marked "This sample is hygroscopic and should be dried at 105 deg. C. (or whatever temperature is used) before assaying." Otherwise there may be a substantial deduction from the weight of the ore without a corresponding increase in the assay. Even though the sample packet is properly dried, it may absorb moisture before reaching the shipper, or, in case of difference, before reaching the umpire, and if the umpire fails to dry it, or dries at the wrong temperature, injustice will be done. Roasted ore high in iron sometimes has the same property.

Some ores, such as those containing gypsum, will dehydrate to different extent, depending on the drying temperature. It is ordinarily assumed that it does not make any difference what temperature is used in drying a sample provided that it is below the ignition point, and that the moisture sample and assay sample are dried at the same temperature. However, if the treatment charge is based on the dry weight, or there is a sliding scale, it may have considerable influence in case of the zeolites previously mentioned.

10. Assaying

It is customary to specify that the silver shall be determined by scorification and the gold by crucible methods, the supposition being that these are the best methods, respectively. This is not always true, as some silver ores give higher results by scorification, and others by the crucible method, and the same holds with gold ores. Fulton says that the scorification method is not to be trusted for silver ores containing much zinc or tellurium.

The fire assay will reproduce its results very closely if repeated under the same conditions, but if "uncorrected," as is the custom, it is only a close approximation to the true result. Fortunately, the richer the ore the greater the accuracy in per cent,

and the variation is not large. This is again referred to in considering the silver deduction in the schedule.

Lead should be determined by wet methods, of course, and if the dry assay is used in the schedule as a base for prices, a statement should be inserted that it is to be determined by deducting from the wet assay from ¾ per cent to 2 per cent, as the case may be. There is only one use for the fire assay for lead under modern conditions, and that is to obscure something, but it still persists from force of habit.

Wet methods are not subject to the losses of fire methods; therefore I do not consider it wise to specify what particular wet method is to be used, and the chemist should be asked for accuracy of results, not methods. This increased need for accuracy has driven out the cyanide method for copper except for a few limited purposes.

The one important exception to the above statement is the determination of the "insoluble." It is in almost as bad a position as the moisture question. On some ores it gives results that are really of value, but in many cases it does not determine anything except the buyer's determination to pick up a few stray cents. It is supposed to give the silica plus alumina, but does not, and the result may be high or low. In cases of garnets or other complex silicates it will yield almost any results wanted, within a range of several per cent, depending on the kind and amount of acid added, the manner of adding it, the time of digestion, the number of times evaporated to dryness, and helps keep the umpire assayer in pocket money even in times of H. C. L. It is a cheap and simple assay to make, and that is all that recommends it to the shipper. It is likely to err on the high side, and that is no insuperable objection to the buyer. It brings in the business, and that recommends it to the umpire.

In some of the cases the shipper will weigh out a portion in the beaker, carefully avoiding the small ones, fill up the beaker with suitable acid, leave it on the stove over night, filter sometime next day, and report an insoluble that is satisfactory from his standpoint. (N. B. Silica is materially soluble in acids under certain conditions.) In the meantime the buyer picks a beaker, a small one, adds as little acid as his conscience will permit, evaporates to dryness, filters promptly, and the poorer guesser pays the umpire $3 to tell them that they are both wrong. Barium sulphate is insoluble and does not have the properties of either silica or alumina, and silver ores frequently contain large amounts.

11. Comparison of Assays

The contract should give the time and manner of comparing assays, preferably by the simultaneous presentation of certificates of assay covering the shipment in question, buyer's assay to govern; but if the seller is not satisfied with the buyer's assay, then the sample is to be umpired, with the understanding that the result, either buyer's or seller's, whichever is closer to the umpire assay, shall govern, and the loser pay the bill. Let the shipper who thinks that it is not fair to let the buyer's assay govern compare this method with the one he is now using and consider what would happen. The effect would be enhanced if there were a more substantial penalty attached than the bill for the umpire assay.

If splitting is authorized by the contract, there is more carelessness about the results, as each side feels that its figures are not final anyway. Of course the knowledge that any carelessness of magnitude by one party will be taken advantage of by the other, either to split or refer to umpire, has a wholesome effect, but still causes much umpiring. In the Colorado investigation one witness testified that he umpired everything. In such cases considerable trouble and expense would be avoided by referring the original sample directly to the umpire, but they are entirely unnecessary.

Occasionally splitting limits are provided in the contract. I do not believe in them at all. In about twenty years' experience I cannot see any particular improvement in the analytical work as actually carried out in ore buying, and I believe it to be due largely to the use of wide splitting limits. The ordinary limits are 1 unit (per cent of the ore) on silica, iron, lime, and sulphur; .5 unit of copper, and .5 oz. silver. The ordinary error of determination on silica, iron, lime, and sulphur is, or ought to be, within .3 per cent, and on copper from .03 on low-grade to .1 on high-grade ores. Owing to dust, impurities in the chemicals, material dissolved from the containers, and other causes there is a tendency for all results to be high. The assayer for the buyer knows this, and in trying to avoid it is likely to overdo the matter slightly. Similarly, the shipper's assayer is going to be sure that he gets all the metal in the ore. The result is a difference, not of .3 but .6. Knowing that there is a compulsory splitting limit, each one, in perfect good faith, will think that the other is trying to "slip one over." Unless stopped, the final result will be two spoiled assayers and inability to get results on a simple determination that will check within reasonable limits. Anything that permits such a state of affairs should not be allowed.

Imagine this condition: A contract with compulsory splitting limits as quoted, an unscrupulous but able shipper (I have seen them), a narrow margin of profit—say, $1 per ton. What would you do if you were the buyer and your assayer returned absolutely correct results, and on comparison you found the shipper reporting .4 high on Cu, .8 low on insoluble and Zn, .8 high on lime and iron, and copper was worth 20c. per lb., lime and iron worth 10c. per unit, insoluble penalized at 15c. and Zn at 25c. per unit? And vice versa, suppose you are the shipper and the buyer is reporting low?

I repeat, compulsory fixed splitting limits should not be tolerated, unless they are made within the error of determination, say .1 for copper, .4 for silica, iron, and lime. Then if a substantial penalty were added for failure to come within the limits, or to have subsequent confirmation by the umpire, such a penalty would be of value.

If the buyer's assay governs, many shippers overlook the effect of the curve of probable error. In any group of assays there is always a slight variation above and below the true assay. Now, on comparison, if the buyer is high and the shipper is low (that is, if that particular assay in the buyer's group has been one of his high ones and it has been one of the seller's unlucky days), the shipper will accept the result and not umpire. If both are high or both low the shipper will also accept the results, but when the turn comes around for one of the buyer's low results to fall with a shipper's high one, the shipper will umpire. Now, the umpire will also have high and low results within the limits of error, and it is therefore to be seen that one-half of the buyer's lowest group are cut out and replaced by the umpire's or shipper's, at least half of which are higher. Thus there is a margin against the buyer.

12. Umpires

The contract should contain a list of umpires to be used in rotation, and provision made for striking out or adding more as desired. It is wise to watch the umpire work carefully and select suitable ones. They frequently receive a great deal of undeserved blame, but it is not all undeserved, and there is always the personal factor. I recall that a number of years ago we obtained excellent comparative results on copper from a well-known New York assayer, the results checking our own to within .1 per cent on 60 per cent material, and another New York firm returned results agreeing wonderfully well, but uniformly about .06 per cent higher. I consider both high class workmen, but my choice as an umpire would depend on whether I were buying or selling. On the other hand, neither one reported concordant results on gold and silver. At the same time we were able to obtain settlements on a gold ore that required close agreement between three assayers, one in Denver, one in San Francisco, and one in Arizona. But the Denver man fell down on the coppers. This was all quite natural. Denver did very little business in copper, and was a gold and silver center. New York did very little fire work, but its analytical standards are high. That holds true today. There are only a few assayers in the West to whom I would care to send work requiring great accuracy in arsenic, antimony, and bismuth, because there is little or no call for that class of work.

The assaying of ordinary gold and silver ores is fairly well standardized and presents few difficulties, but how about the few unusual ores that require special treatment? How far should the umpire go, or be instructed to go, in the effort to determine the actual contents? The cupellation loss on low-grade ores is greater in percentage than on high-grade. Should the umpire combine lead buttons by scorification for cupellation in order to reduce this loss, or not? The answers to many such questions are left unmade. When required they should appear in the contract. In their absence the umpire staggers along and does the best he can with occasional kicks from both parties.

At present anyone, honest and competent or otherwise, may open an assay office and solicit trade. The smelters offer lists of names of men known to be suitable for selection as umpire by the sellers, and will usually add new ones to be tried out if so requested. I believe that the suggestion that public assayers be examined and licensed by the state is an excellent one. Licensing on the basis of a simple fee and registration is of no value, but if done on the basis of a real examination or some form of civil service competition much good might result.

As a class the assayers rank high in integrity, but I have known of several fakers who have lived for many years on the fees of the gullible and who were a source of injury to the rest of the fraternity. Their usual claim is that they can obtain more gold or silver by their methods than can the regulars, and they cause considerable discontent among the inexperienced.

13. Shipper's Representative

Provision is always made for the presence of the shipper or his representative at the weighing and sampling. This is as much for the buyer's protection as the other's. Caesar said "Men are prone to believe that which they earnestly desire," and the miner still retains that characteristic. He usually believes that his ore contains more than it actually does, and if he or his representative is not present at the sampling, there is often a howl when the returns are in.

14. The Schedule will be considered later.

15. Quotations

The contract should specify what quotations are to be used and where they are to be obtained. They are, variously, those of the date of receipt, date of sampling, average of the week of receipt, or thirty or ninety days after receipt, the last to throw the speculative element on the shipper or to avoid loss to the buyer during the time required for treatment of the ore in periods of falling prices. The contract should also state what is to be done if the date falls on a holiday, or quotations are suspended for one cause or another. Copper quotations are usually for electrolytic copper, and for either wire bars or cathodes, the latter being the lower. If London prices are used, "Standard" is the base though "electrolytic" is quoted and formerly "Chile Bars" and "Best Selected" were used. "Standard" is not as high a grade as "electrolytic," and consequently is lower in price. It is always quoted in sterling per long ton. The most extensively used quotations are those of the Engineering and Mining Journal. Lead quotations are those of New York, though formerly London for soft Spanish lead were much used.

16. Exchange

Exchange applies only to contracts involving foreign countries, and the local conditions must be carefully considered. As with quotations, care should be used to specify the time and source, and also whether buyer's or seller's or average exchange

should be used. In Chile, for example, preparation must be made for three exchanges.

17. Taxes

The contract usually says "All taxes are for the account of the seller." Quite simple and clear! The last few years have taught several lessons in this line. Supposing that you are mining in Mexico, and you sell your ore on the basis of quotations ninety days after delivery, and you have delivered your ore, and the government then puts a 10 per cent production tax on the metal contents to be collected on export. Who gets stuck and how much? Quite so!

It is advisable for the shipper to allow the insertion of a very complete clause covering this point, because the smelting is usually on a comparatively narrow margin, and if not protected in that way the company will protect itself elsewhere in the contract, with a good broad margin to cover the risk involved. Agreements frequently specify "all taxes in force at the time of delivery of the ore or within ninety days thereafter," to allow time for treatment. During the war, in countries like Chile, import taxes in the countries to which the ore or its products were shipped for refining were included.

18. Advances

Most shippers, in common with every one else, are chronically short of funds, and want advances. The terms under which they may be obtained, if at all, and the method of liquidation, should be included. The smelter may advance on receipt of the ore, or on advice of shipment, and may require provisional bills of sale, insurance of the ore in transit, or some other method of protection.

19. Settlements

Liquidations and settlements may be made immediately on comparison of assays, on receipt of umpire returns, or monthly. The time and manner depend much on the method of bookkeeping by the two companies. Usually provisional liquidations are made at the time of comparison of assays, and final settlements on acceptance of the final assays by the shipper, or on receipt of the final quotations when these are of some deferred date.

20. Payments

Time, manner, and means of payment should be specified. The contract should state whether settlement for all shipments is to be made on the first of each month, or whether settlement of each lot is to be made separately; whether settlements are to be made by cash payment to the owners of the product shipped, or to the owner's representative; whether payment is to be made by check or by draft; on what city exchange is to be drawn; and, if settlement is to be made in foreign countries, in what currency payment is to be made.

21. Deleterious Substances

These are occasionally prohibited above certain limits. Chlorine is believed to cause substantial losses of silver and copper. In lead smelting, arsenic and antimony cause the production of speiss and poisonous fumes; in copper smelting they cause poisonous fumes only. The time is approaching when they will be valuable elements, though there is now more than the market can absorb. They can be easily recovered by baghouses or Cottrell plants, but the cost is still equal to the returns in the limited market.

22. No Payment

Some companies insert in the contract a clause that no payment will be made for any substance for which payment is not specifically provided. Many ores contain minute amounts of cadmium, bismuth, nickel, and other substances, in amounts so small that the cost of determination would be more than their value. They are later recovered as byproducts, and the clause is simply intended to forestall argument.

23. Force Majeure

Both parties should be relieved of the burden of the contract in case of force majeure, acts of God or nature. But what is force majeure and how is it determined? War undoubtedly might constitute a case of it, and so might insurrection. Would riots, strikes, lockouts, or simply shortage of labor be so regarded? Would the closing of the mine, mill, or smeltery constitute proof of it, or might such action simply be construed as an attempt to break the contract? Would increase of cost of essential materials, sufficient to cause a loss in operating, be force majeure? In case of a suspension of operations due to this cause, does the contract terminate, is it simply suspended, or is it extended for a term equal to that lost? The contract should as far as possible answer these questions, although the very phrase used, "acts of God," indicates the impossibility of foreseeing all of them.

24. Special

These cover provisions for the transfer of the contract, or any unusual condition. There is often an article providing for reference of all disputes to arbitrators instead of to court proceedings. What should be done about shipment of ore which contained less value than the charges against it? Should the shipper be expected to pay the difference or not? The answer, of course, depends on the local conditions.

All the above subjects might come up in connection with the ordinary ore contract, the simple agreement of purchase and sale. They may not be written, and many are simply accepted as a matter of course, or, as the Chileno puts it, "Por la razon o por la fuerza." It does seem complex, and we have not touched the real meat of the cocoanut, the schedule, but it is not as bad as it seems, and three or four typewritten pages will cover the whole thing so as to answer ninety or more per cent of all the questions that may arise. That is the reason for the forms in common use. They are not to "slip one over," but to avoid all possible disagreement and bad feeling, and only exceptionally contain a "nigger in the woodpile."

[To be continued]

American Mining Congress Meets at St. Louis

Problems of Mine Taxation, Gold Situation, and War Minerals Relief Considered in Special Conferences—Protective Tariff Session Draws Small Audience—Exposition of Mines and Mining a Success

THE convention of the American Mining Congress that was held in St. Louis, Mo., on Nov. 17 to 21 can be recorded as a profitable experience by the delegate or visitor who was fortunate enough to be able to attend it—and actually did so. A most valuable feature of any convention is the opportunity it affords to meet others, in this case from all parts of the country, who are engaged in similar lines of work and are troubled with the same problems. This feature together with the fact that some of the most vexing questions of the day were scheduled for discussion at the St. Louis convention should have brought together a much larger number of men representative of the American mining industry than were actually seen at the various gatherings and sessions during the week.

The attendance, it may be said, was not bad, but it should have been better. The convention was well advertised. The official call sent forth by the Congress well in advance of the event was responded to by the appointment of delegates of all degree, many of whom were not much in evidence in St. Louis, at least in the neighborhood of the Planter's Hotel or the convention halls. St. Louis, its Chamber of Commerce announces, is at the cross roads of the country. This in itself is, perhaps, as much of an inducement to the new arrival to continue his journey on, as it is an inducement to remain. At any rate, some of the delegates evidently went absent without leave but enough appeared to make the convention a success.

It may here be remarked, without any attempt to flatter, that the importance of the American Mining Congress to the mining industry of the United States was well demonstrated at St. Louis. The Congress styles itself "the fighting organization of the mining industry." It is the vehicle through which this industry can reach the legislative bodies at Washington as a concrete and organized force. An organization such as this is needed. It is needed especially in view of the fact that in many states the mining industry is forced to bear an unjust burden of taxation to the advantage of other lines of industry. For example, it may be cited without further comment, that the mining industry in Utah is now confronted with the necessity of paying seven different kinds of state and Federal taxes.

In giving publicity, as it does, to new developments in mining legislation, both through its bulletins and through the Mining Congress Journal, and in acting as a medium of expression on legislative matters for the industry, the American Mining Congress performs a function carried out by no other body in the country. The St. Louis convention debated many topics of current importance and before it adjourned expressed its opinions and recommendations in the form of resolutions, some of which are to be brought to the attention of the national Congress at Washington. The questions of mine taxation, of remedying the present situation of gold producers, of obtaining more liberal legislation for the relief of war mineral producers, as well as those of wiping out bolshevism and promoting better relations between capital and labor were among the subjects that received the attention of the convention.

Program Covers Wide Range of Subjects

It was physically impossible for a delegate to have attended all the sessions of the convention. The lengthy program and the limited time made it necessary to hold simultaneous sessions of which the delegate was free to take his choice. In all, there was the National Gold Conference, the War-Minerals Conference, the Tariff Conference, and a session on mine taxation. The program also included the National Conference of Schools of Mines, the first of its kind to be held in the country, the National Oil Shale Conference, two sessions on subjects relating to the coal industry and one on safety and welfare work, to say nothing of two informal dinners. And poured round all, like the ocean in Bryant's "Thanatopsis," was the National Exposition of Mines and Mining, at which about 150 exhibits were shown. To get into the main convention hall it was necessary to pass a great display of mining machinery and mineral products, so that no effort was required if one desired to visit the Exposition.

Bulkeley Wells Points Out Task of Congress

Preliminary conferences of the committee on standardization of mining equipment took place at the convention headquarters at the Planter's Hotel on Saturday and Sunday, but the Congress, and the Exposition as well, were not formally opened until Monday afternoon, Nov. 17. This occurred when, after speeches of welcome on behalf of various St. Louis organizations, Bulkeley Wells, of Denver, president of the American Mining Congress, made response in his opening address. Mr. Wells stated that the chief task of the Congress was to develop a plan for readjusting industrial relations that will be satisfactory to employer and employee.

"There are no sound objections to collective bargaining, provided the conditions surrounding it are sound," said Mr. Wells. "Indeed, it furnishes the only practical method of dealing with large numbers of men. But the parties to such a discussion of wages and conditions of employment must, actually and with duly conferred authority, represent at least a majority of those concerned, and must be firmly and equally bound in their final agreement.

"Labor organizations should be compelled by law to incorporate and thus become as legally and financially responsible for the observance of their contracts as are employers. The power of organized labor to do good and to do harm is amply proven, but the responsibility for harm and injustice done is too often evaded.

BULKELEY WELLS
President of American Mining Congress

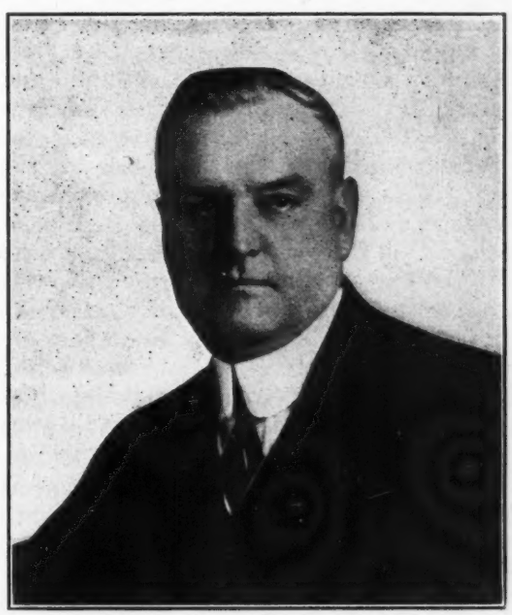
"As proof of the sincerity of the words of its leaders, organized labor should emphatically deny the assertions that its purpose in demanding shorter hours of employment is to limit production. Most reasoning employers will no longer oppose an eight-hour day. Eight hours' work, with eight hours' recreation and eight hours for sleep, can hardly justify complaint on the part of labor. Fewer hours of employment will inevitably increase the cost of all production and develop indolence and extravagance on the part of labor. The one fundamental cure for the high cost of living is, naturally, increased production."

Following Mr. Wells came Van H. Manning, director of the U. S. Bureau of Mines, who as personal representative of the Secretary of the Interior, formally declared the Exposition open. Dr. Manning in his speech drew attention to some of the principal problems confronting the mining industry. He referred to the coal strike and, while avoiding mention of the merits of either side, said he felt it his duty to discuss a problem that has concerned both miners and operators in the past, namely the frequent periods in which the bituminous mines, especially in the spring and summer months, are not at work from causes not under the control of either the operator or the miner.

"In the five-year period, 1912 to 1916, the time worked in the bituminous mines ranged from 195 to 232 days of a possible 310 working days," said Dr. Manning. "In 1917 the mines worked 243 days, and in 1918, under abnormal war conditions, 249 days. In round figures, the mines are idle for one-third to one-fourth of the time in ordinary years. The reason is well known to you that: bituminous mines are opened and manned on the basis of the maximum or winter output, which in large part arises because consumers reduce their purchase of coal in the spring and summer months.

"Although some bituminous coal does not stock well, yet there are ways and means by which this can be done, but it requires careful storage, and the storing and rehandling costs money. The trouble is that the consumer does not perceive the cost of this to himself. He thinks to himself, it is all right for Mr. Jones to buy his coal early and in this way help out the miners, but it is going to be inconvenient for me to tie up my money so far in advance, and so does not order coal early in the season. It must, therefore, be made worth while to the consumer from a money standpoint.

"Since Congress has prevented by law agreement among operators as to price, it becomes impossible for them to take care of this situation by agreeing to sell their coal for materially less in summer and making it up in winter. It has been suggested that this could be taken care of through the Government establishing summer and winter rates on coal, so fixed that there would be no loss of net revenue at the end of the year; or, still better, establishing a sliding scale that would produce an equalization of coal purchases and shipments through all the months of the year.



VAN H. MANNING
Director, Bureau of Mines

"The effect of this would be that the miners would have steady work and there would be readjustment by which fewer mines could furnish the total amount of coal needed. This would not necessarily mean the shutting down of mines, for coal production in 1918 was 113,000,000 tons, or 20 per cent greater than in 1913, and if new mines were

not opened for awhile productive capacity would quickly become adjusted to consumption. Fewer miners would be required, and we would have the advantageous condition in this country which prevailed in Europe before the war, where the miners worked practically every working day in the year, and the operators were able to count on a regular output.

"The coal industry of the country will be greatly benefited by a good export business. We have never had a large export coal business before because Great Britain, through its dominant position in shipping, had the lion's share of the business. But England has, temporarily at least, lost the larger part of its coal export business through the curtailment of production, resulting from reduction in the hours of labor of the mines. The United States coal export trade should be placed by its own great shipping facilities on a firm basis where it can compete on even or better terms because of our more easily and cheaply mined coal. It is probable that the Mediterranean and South American regions will look to the United States for their coal supplies.

"The Government has wisely put into the hands of the operators, through the Webb-Pomerene Act, an opportunity for handling export business through a corporation by means of which operators who export coal can dispose of their coal to the best advantage."

Committee on Resolutions Appointed

The opening session was followed by the appointment of the Committee on Resolutions. Each state delegation selected one of its number to serve on this committee. Thus, it was thought, the resolutions to be adopted would be more representative of the wishes of the convention and of the mining industry at large. The value of this method, however, depends largely on how representative the so-called state delegations are in the first place. If, by any chance, but one member was present from any particular state, as happened in the case of Alaska, that member became forthwith a member of the committee on resolutions. It may therefore happen, unless the state delegations are carefully selected, that men not qualified to serve may find themselves on this very important committee on resolutions.

The importance of this committee was increased by the fact that the convention worked under the rule that all resolutions introduced to it must be referred to the committee on resolutions without debate. This procedure saved much time that might otherwise have been lost in prolonged debate on the convention floor.

The evening session was enlivened by what turned out to be a joint discussion of the railroad problem. Alba B. Johnson, president of the Railway Business Association and formerly president of the Baldwin Locomotive Works, maintained that state and federal regulation was strangling the railroads, while Clifford Thorne, of Chicago and formerly a member of the Interstate Commerce Commission, stated that the railroads during the three-year period ending June 30, 1917, showed a greater net return upon their investment than ever before in their history, except 1907.

Mr. Johnson advocated the passage of the Cummins bill or legislation embodying its general features with some modification. He urged the creation of a federal board of transportation to pass upon railroad security issues and to determine the amount of money the roads must have from rates and to make surveys of needed railroad facilities. He urged that Congress guarantee the roads adequate rates so as to re-establish their credit and attract new capital. He recommended the substitution of federal for state regulation of the carriers.

On the other hand, Thorne characterized the provisions of the Cummins and the Esch bills as revolutionary in character and calculated to result in injustice to the shippers. He attacked the accuracy of literature and statistics now being circulated on behalf of proposed railroad legislation and rate increases, and said that a sweeping increase in freight rates would be deplorable.

"Let us have no more changes in rates, rules or regulations causing disturbance in present conditions, rate relationships," said Thorne, "or causing increased charges on traffic as a whole or increased operating burdens on individual industries, without a full, open public hearing by a disinterested tribunal where both parties are heard and know what the other side is presenting. Let us abandon all revolutionary changes which would disturb existing commercial conditions."

Samuel O. Dunn, editor of "Railway Age," declared that unless the railroads get $6,000,000,000 of new capital during the next three years, they will be unable to cope with the growth of traffic and that increased production would do little good.

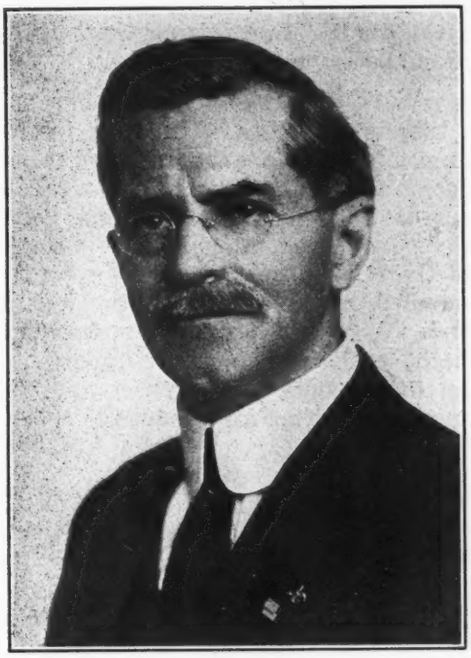
Whatever be the merits of the foregoing arguments on the railroad problem, it was to be noted that Mr. Johnson's remarks went practically unapplauded, whereas Mr. Thorne was interrupted by frequent demonstrations.

Greater Production the Need of Today

George Otis Smith, director of the U. S. Geological Survey, in addressing the convention on the following day, made a plea for greater production. He described the work of American mining engineers, backed up by capital, in constantly lowering labor costs by increasing the investment in improved mine equipment. Said Mr. Smith: "The great strides in advancing our mining industry have come through large investments in plants, and we must in fairness include a living wage for capital as well as for labor when we figure the cost of winning this or that metal from the lowgrade ores, metal which a few years ago not all the labor in the world could have won for the use of mankind.

"As the railroad's largest customer," Mr. Smith continued, "the mining industry is largely concerned in the solution of the transportation problem now so prominently before the American public. It is plain that adequate service and low rates mean much to the health if not to the very life of our industry,

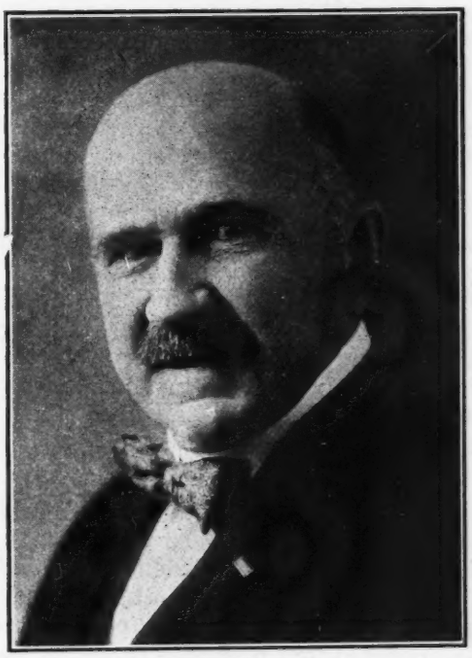
yet even as large buyers of transportation we should not seek preferential rates at the expense of the rest of the public, any more than as sellers of fuel and metal we should be willing to let the Railroad Administration procure its supplies from our mines and furnaces and mills at prices so related to bare cost that the public must make up the difference. You coal operators know too well how that style of shoe pinches to wish the same kind of narrow policy on the reorganized railroad system. We must allow freight rates to be determined by facts of transportation cost, rather than by what we claim to be exigencies of our own business. Even a legislature can not impose rates, however they may seem calculated to serve public interest, that would deny to the railroad the reasonable reward necessary for its financial and physical upkeep. The Supreme Court has ruled that a state law can not force a railroad to haul coal at a loss on the supposition that the profits in the wheat traffic will recoup the carrier. So it is



J. F. CALLBREATH
Secretary, American Mining Congress

JOHN T. BURNS
Assistant Secretary

WALTER DOUGLAS
Executive Committee



E. P. MATHEWSON
Executive Committee

that in a spirit of fairness the mining industry ought to help in the adjustment of rates on a basis adequate to revive healthy conditions on our railroads.

"In its relation to the mining industry the Government needs to be fair, whether the relation is that of mineral landlord or of business investigator or of tax collector or of purchaser of fuel and metals. Disregard of established equities, ill-advised charges of bad faith, threats of commandeering, or offers of confiscatory terms are no longer warranted in these days when the Government's necessities are no greater than those of other consumers. Indeed, the principle laid down by President Wilson during the war that the Government rate should be the same as the rate to the public should have been followed by every one down the line, whatever his title or insignia of office. Now that we have had time to regain our poise, I think the public servant generally wishes to serve rather than to commandeer.

"In my opening words I suggested that welfare rather than wealth be the dominating note of our industry. But wealth may be defined as provision for future welfare, inasmuch as it is the surplus beyond present needs. To the present-day problem of industrial unrest, then, what is the answer, except to create a larger surplus? As I analyze the economic situation, surplus of production over consumption can come through decreased consumption or increased production or both, but it can not come through restricted production or increased consumption or both, and the shortened day of labor surely means both less produced and more consumed. Whether among individuals or among nations, the old-fashioned ideas of industry and thrift come nearer the natural law than the new proposition of a five-day week and a six-hour day. No protective tariff can safeguard the home market for industries based on a 30-hour week, nor can our industries expect to win or hold a place in foreign markets on any part-time program, unless there is some international agreement making for universal indolence, and even then we may discover that there can be no return to Garden of Eden conditions of consumption without productive industry. I believe the earliest precedent was a continuing injunction for a six-day week, and no lower court has since ordered any better rule of action or reversed that Divine injunction."

Delegates Dinner an Event

Two informal dinners for delegates marked the program of the convention. At the first, the present industrial situation was briefly discussed. The second, however, was an occasion to be remembered, informal as it was. A program of entertainment had been arranged that made one forget he had come for such a gross purpose as dining. The toastmaster was Robert E. Lee, of St. Louis, the very active vice-chairman of the Exposition Committee, who can be serious on occasion. As a raconteur, Mr. Lee is unexcelled. One of his stories was absolutely unprintable, being delivered in near-Chinese, a language not heard in the Far East.

Chief among the speakers was Governor Frederick D. Gardner of Missouri, Bulkeley Wells, and Rev. Charles W. Gordon. Dr. Gordon, who had spoken the day before on the Winnipeg strike, now addressed those present on the present industrial situation in Great Britain, whence he had just returned. A speech was also made by Fedor F. Foss, chairman of the Russian Mining Commission. The dinner was one to be remembered.

War Mineral Producers Confer

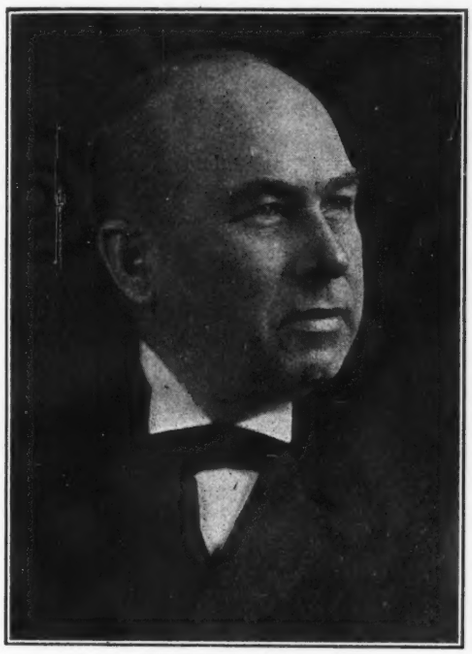
Since the signing of the Armistice, in fact, since the bottom fell out of the chrome market before the Armistice, much has been heard about relief for the producers of war minerals, oftentimes with bitter expressions from the producers. It was therefore expected that these same producers would be present in numbers at the sessions of the War Minerals Conference, or at least strongly represented. Such was not the case. At the most important session less than fifty people were present and when the opportunity was given for producers to air their views, Victor Rakowsky, of Joplin, Mo., was practically the only one to respond.

Mr. Rakowsky complained that the War Minerals Relief Commission had in some cases acted on questions involved on its own interpretation. He stated that all over the United States there was a feeling that the Relief Act was not being administered properly and that something was wrong. On the other hand, he stated that personally he felt that the Commission had done the best it could. Formation of a War Minerals Section of the American Mining Congress was proposed by Mr. Rakowsky in concluding.

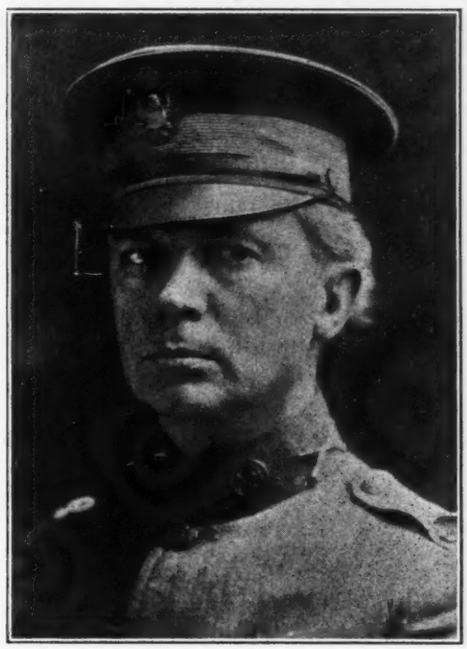
Previous to this, James F. Callbreath, secretary of the American Mining Congress, had outlined the history of the campaign to increase the production of war minerals and had stated that Congress at Washington should further instruct the War Minerals Relief Commission to relieve the producers. Following Mr. Callbreath, Herbert W. Smith, chief of the war minerals division of the Mining Congress, said that the position of the organization with respect to claims for relief was well understood—that it stands for the rights of the claimants as a whole.

The chief speaker at this conference was ex-Senator Shafroth, of Colorado, a member of the Commission. Mr. Shafroth recounted the history of the passage of the present Relief Act through Congress. He recalled and emphasized the sentiment of the public, especially of the farmer, against it, and pointed out how this sentiment was reflected in the House. The limitations put on relief in the Act had been inserted deliberately, he said, for without them the Senate never could have obtained the consent of the House to the passage of any relief measure at all. Senator Shafroth further said that where the Commission had found it necessary to interpret the Act it had been as liberal as possible. It has also avoided technical features wherever possible. It has taken the position that where a man was sent out to stimulate production and this was interpreted as a request, the Commission should construe this as a

request though actually no request had been made. The Commission, said Senator Shafroth, had construed a request made by any agent of the U. S. tungsten in sufficient quantities. The Commission has held that where a mine is not of commercial importance, if the Government has made a personal



FREDERICK GARDNER
Governor of Missouri



ROBERT E. LEE
Vice-Chairman of Exposition Committee

H. N. LAWRIE
Chief of Precious and Rare Metals Division

HERBERT W. SMITH
Chief of War Minerals Division

Bureau of Mines as coming from the Director of the Bureau. Some cases, he said, had been decided on questions of commercial importance. Production was not sought from prospectors without property. The law prescribed, he continued, that no claim shall be allowed or paid unless expenditures were made for properties of chrome, manganese, pyrites or

request, it is estopped from later claiming that the property is not of commercial importance.

Following Mr. Shafroth, Philip N. Moore, past president of the A. I. M. E. and also a member of the Commission, supplemented his colleague's remarks by talking on "The Commission's Viewpoint." He defined a deposit of commercial importance as

one carrying ore of sufficient quantity and richness to permit of being worked at a profit for a reasonable period of the war at the time when operation was undertaken. This reasonable period, he said, was taken as being two years. In concluding, he said, "You came to tell your troubles, but we got to ours first. We are rejecting some righteous claims—can't help it. We are allowing some unrighteous claims."

Without doubt, any grievances held against the Commission by members present must have largely been dissipated by the frank statements of the Commissioners. At any rate, so few attended the next session of the War Minerals Conference on the following day that it was called off. This was to be regretted, as addresses by Dr. R. B. Moore and Dr. Dorsey A. Lyon had to be cancelled. Dr. Moore, chief chemist of the U. S. Bureau of Mines, had for his subject "The Development of Commercial Helium," and Dr. Lyon, who is chief metallurgist and supervisor of stations of the Bureau, had planned to talk on "Increased Production by the Use of By-products."

On Thursday afternoon, the Tariff Conference engaged the attention of the war mineral men. E. C. Voorheis, of the Atolia Mining Co., California, spoke on the need of a tariff on tungsten. Fletcher Hamilton, state mineralogist of California, outlined the American quicksilver situation. Dorsey A. Lyon read part of a paper on the "Utilization of American Graphite and American Clay in Ceramics." An attempt was made by a member from Alabama, who was interested in graphite, to get into the record the statement that Alabama graphite made better crucibles than the imported variety. Evidence of this, however, was lacking at the moment. The chief address of this session was made by E. P. Costigan, of the U. S. Tariff Commission, who talked on the work of the Commission. The meeting was poorly attended, the delegates thus evincing little interest in a protective tariff on war minerals.

On Tuesday afternoon, Nov. 18, the first meeting was held of the National Gold Conference at the Statler Hotel with H. W. Seaman, president of the Trojan Mining Co., of South Dakota, presiding. A short and interesting address was made by George M. Taylor, president and general manager of the Portland Gold Mining Co., of Cripple Creek, Col. Mr. Taylor pointed out the fact that the gold mining industry had declined and would shortly disappear with the continuance of the present conditions.

H. N. Lawrie, chief of the precious and rare metals division of the Mining Congress, then presented a paper illustrated by charts which were of great interest. These charts showed, among other things, that the gold produced in the United States was only to a very small extent derived as a by-product of other metals, and came almost entirely from gold mining proper and mainly from lode mining. The very rapid decline in the production of gold since 1915 was also shown. An interesting fact in this connection is that the use of gold in manufacture has increased above normal as rapidly as gold production has decreased, so that in 1919 the consumption for this purpose (outside of coinage) exceeds the total production and there will be no gold left for coinage purposes.

A resolution following Mr. Lawrie's suggestions was finally drafted for presentation to the Committee on Resolutions, making the following recommendation:

> That the Congress of the United States be and it is hereby earnestly petitioned to pass such speedy and remedial legislation as shall provide for a period of five years from and after the passing of such legislation, there shall be paid to every person producing gold from the mines within the United States and its possessions, under such terms and conditions as may properly be provided, a premium of $10 per fine oz. of such gold so hereafter produced, such payments to be made out of funds to be provided by an excise of $10 per oz. on the use, manufacture or sale of gold in the United States for other than coinage or monetary purposes and from other funds in the Treasury of the United States, not required for specific purposes, and,
>
> It is further recommended that after five years from the passage of such legislation the premium and excise so to be provided shall be adjudged in accordance with the rise and fall in commodity prices as compared with the average for the five-year period herein referred to; this readjustment and excise to be made each year and until such time as the premium and excise can be abandoned on account of the restoration of a price level which will satisfactorily maintain the normal production of new gold in the United States to meet all industrial requirements of the arts and trades.

When this resolution later came before the Congress for acceptance, it was adopted after substituting the word "suggested" for "recommended" and making other minor changes in the wording. Objection to the resolution in its original form came from E. P. Mathewson and Edward Ludlow.

Taxation Session Marked by Interesting Addresses

The meeting of the Mines Taxation Section was held on Thursday, Nov. 20, at the Planter's Hotel, under the chairmanship of Dr. R. C. Allen, vice-president of the Lake Superior Iron Ore Association, was of especial interest and a number of papers were presented. The first paper was on "Mine Accounting in Relation to Federal Taxation," by Wade Kurtz, consulting accountant, Kansas City, Mo., and was followed by an address on "Income Taxes as Applied to Mines," by A. P. Ramstedt, comptroller of the Hercules Mining Co., of Wallace, Ida. A notable paper was presented by T. O. McGrath, auditor of the Shattuck-Arizona Copper Co., Bisbee, Ariz., on "Protection Against Unjust Taxation." Mr. McGrath called attention to the fact that in a modern mining enterprise it took several years and several hundred thousands of dollars before the mine could be put on a paying basis, yet the first year that profits were declared, all profits above 8 per cent were subject to heavy taxation. Mr. McGrath claimed that the preceding years, in which no return was obtained upon the capital invested, should be taken into consideration; in other words, that an 8 per cent return should be allowed out of the first profits on the invested capital during all the preceding years before

the taxable surplus should be arrived at. George E. Holmes, the author of "Holmes on Federal Taxation," of New York City, also read a paper on "Taxation of Income from Mining," and there were contributions to the discussion of the general subject by several other experts. All these papers will be submitted to the Income Tax Unit of the Natural Resources Division of the Bureau of Internal Revenue.

The annual meeting of the American Mining Congress was held at the Planter's Hotel on Nov. 20. The minutes of the preceding meeting were adopted as read by the secretary, James F. Callbreath. Mr. Callbreath outlined the work of the past year in vigorous fashion and recommended that a capable freight man be added to the official staff of the organization at Washington. The following officers were declared elected for the ensuing year: Bulkeley Wells, president; Harry L. Day, first vice president; Col. D. B. Wentz, second vice president; E. L. Doheny, third vice president; and James F. Callbreath, secretary. E. P. Mathewson and Walter Douglas were appointed members of an executive committee, including the president, which shall have power to act between directors' meetings. Four directors were elected for a term of three years as follows: R. C. Allen, Cleveland, Ohio; Col. D. B. Wentz, Philadelphia; T. T. Brewster, St. Louis; and John C. Howard, of Salt Lake City. The meeting then adjourned.

In all twenty resolutions were introduced to the convention, of which two were killed. The first introduced by Walter Douglas, president of the Phelps Dodge Corporation, was a protest against the inadequate policy of this Government in Mexico. It was worded as follows:

Be it resolved, that the American Mining Congress, assembled in annual convention at St. Louis, Mo., hereby protests to the Department of State of the United States against the continuance of policies by the American Government that make inadequate provision for the safety of American mining engineers, operatives and employees in the practice of their profession and in caring for the business interests entrusted to them, and be it further resolved that this Congress urges that the Government of the United States demand full and immediate reparation for losses and injuries suffered by American mining engineers, operators and employees in the lawful exercise of their duties in foreign countries and that the Government of the United States take such steps as will insure that the constitutional rights of American citizens shall protect them on our borders and throughout the world, and be it further resolved that a copy of these resolutions be forwarded to the President of the United States through the Vice President and Speaker of the House of Representatives.

This resolution was adopted in spite of the objection of the Mexican consul at St. Louis, who was a delegate to the convention. Another resolution was adopted aimed at Great Britain's present policy of excluding aliens from ownership or control of oil property within the borders of the British Empire and demanding that similar action be taken by this country in case the British stand were maintained.

Aid for gold producers was suggested in a resolution, the text of which has already been given. The convention also voted in favor of a resolution recommending that destruction of gold and silver coinage be prohibited by law.

Antistrike railroad legislation was asked in a resolution which stated that the mining industry furnishes more tons of freight than all other industries combined. This resolution ran as follows:

First, in any railroad legislation ample provisions shall be made for such regulation of railroad rates as shall produce such rates of return upon capital invested in railroad securities as to make an investment in such securities sufficiently attractive to insure capital for railroad betterment and extension.

Second, that in any railway legislation provision be made to prevent strikes upon railroads until the matters which may be the subject of controversy shall have been submitted to investigation and arbitration by some tribunal on which the public is represented.

The convention put itself on record as opposed to "red" doctrine of any kind and in favor of enforcing existing laws against anarchy and of passing further laws. It further announced its belief in the right of labor to organize and in the right of the workman to work where he pleases. It was also proposed that the Mining Congress appoint a committee to make a survey of the industrial situation with the idea of determining what laws should be passed to bring about industrial peace.

War Minerals Committee Suggested

Appointment of a war minerals committee was recommended which should work with the president of the American Mining Congress in any effort to secure further relief for war mineral producers. Development of Alaska's mineral resources through further railroad construction and powersite work was also urged. Another resolution asked for legislation to authorize the mining of oil shale upon public lands.

Other resolutions were passed, one of them bearing on the existing situation in the coal industry and recommending that an attempt be made to adjust the price of coal according to the season, so as more nearly to equalize its production throughout the year.

Many Interesting Speeches at Other Sessions

There were various other sessions of general interest throughout the week. The Oil Shale Conference resulted in the organization of a permanent oil shale section of the Congress.

At the evening meeting of Tuesday, Nov. 18, George W. Simmons, vice president and general manager of the Simmons Hardware Co., of St. Louis, who has recently traveled in Russia on Red Cross work, gave a vivid first hand discussion on "The Russian Radical as I Found Him," describing the condition of Bolshevik Russia at the present time as criminal and anarchistic to the last degree. Allen Walker, manager of the foreign department of the Guaranty Trust Co. of New York, delivered an interesting and scholarly address on "What Is the Matter with America," referring to the present tendencies of labor to ask more pay for less work. Mr. Walker exclaimed: "I myself am a wage earner and

always have been that, yet I am not fool enough to accept a raise in wages for doing less work than formerly and of a punker kind."

An exceedingly interesting speaker at this session was Rev. Charles W. Gordon, of Winnipeg, Man., better known as the author "Ralph Connor." Dr. Gordon had for his topic "The Red Menace," and described the general strike that occurred at Winnipeg last spring and how it was broken by the citizens themselves with the aid of the Northwest Mounted Police.

On Friday morning a general session of the Congress in the convention hall was marked by two very notable addresses, that of John Leitch on "Industrial Democracy," and Charles Piez, president of the Link Belt Co., of Chicago, on "Labor and Its Responsibilities." Mr. Piez' address was especially noted for its firmness as regards the present labor situation. Mr. Piez pointed out that it was impossible to compel labor unions to incorporate so as to make them liable under the law for their acts and proposed the enactment of a law which would make unincorporated organizations legally responsible, a suggestion which is a very valuable one and which is especially recommended to consideration of the public and of the Congress in Washington. Mr. Piez' speech will be published and distributed.

A very patriotic, anti-radical spirit permeated the whole Congress and was evidenced in many of the speeches which were of a notable character. An address by Governor Roberts of Tennessee, describing how bolshevism was being combated in that state, was enthusiastically received by the convention, as were those of Dr. Gordon and Mr. Piez.

Efforts to Popularize Exposition Succeed

A session on safety and welfare was held on Wednesday, Nov. 19, under the direction of the U. S. Bureau of Mines, Morton F. Leopold presiding. Mr. Leopold took occasion to object to the nominal admission fee of 25c. charged for the Exposition of Mines and Mining. Apparently his protest was heeded and the doors thrown open to the public, for the small boy was very much in evidence during the last few days. Exhibitors who had been complaining of the poor attendance now had to watch their exhibits and "literature" more carefully. The addition of a band in the evening did much to popularize the Exposition. It is a debatable question whether a sparse attendance of interested persons is of more value to such an exposition than a large attendance of people who do not comprehend what they see.

At the welfare session referred to above a very interesting talk was given by C. W. Seiberling, vice president of the Goodyear Tire & Rubber Co. Mr. Seiberling discussed how his company had grown since its incorporation and attributed it to the admirable organization and teamwork of their employees in their recreation as well as in their work at Akron. An address entitled "Does 'Safety First' Mean Increased Dividends," was delivered by W. D. Ryan, Commissioner of Safety of the Bureau of Mines.

Mineral Statistics and the League of Nations

Reference has been made in the Engineering and Mining Journal (July 26, 1919, p. 152) to the importance of having better statistical information of international scope and the suggestion that an organization be formed within the League of Nations to collect and distribute such data.

The Economic and Finance Section of the League of Nations held a conference on the subject in August, 1919, and its report has now been published in London. The "Economist" of Nov. 1, 1919, gives the following brief summary of the more important conclusions, which, although not having the character of binding decisions, met general support:

A. That the institution of a Central Advisory Council on Statistics, to meet normally at the seat of the League, is desirable; this council being constituted partly of members of the separate statistical bodies referred to below, and partly of statisticians and other persons nominated by the League.

B. That, in principle, there should be a separation of the main classes of statistics, and that these should be entrusted to several different bodies or institutions working in conjunction with the League.

C. That these bodies should be, in the case of agricultural statistics, the International Institute of Agriculture at Rome; in the case of labor statistics, the International Labor Office; and, for the time being, in the case of demographic statistics, the Permanent Bureau of the International Institute, at the Hague.

D. That a committee be appointed to consider the definite distribution of statistical work between the various bodies connected with, or proposed to be connected with, the League of Nations, and to make suggestions for the establishment of other bodies than those already referred to.

E. That the appointment of such a committee, if thought advisable, should be undertaken by the Secretary-General of the League of Nations.

"The Armenian Mandate"

Your leading article in the current issue of the Journal on "The Armenian Mandate" is most timely and illuminating, and for that reason it seems worth while to point out an error, even though that error in no wise invalidates your main contention.

You say "The Armenian territory is bordered . . . on the north by the similar republics of Daghestan and Georgia, both Mohammedan." Georgia is not Mohammedan. Like Armenia, it is Christian, and its church is autonomous, or was so until about the year 1900, when the Russian government seized the ecclesiastical income and otherwise assumed more or less control over the Armenian Church. To be sure, there are on the fringes of the ancient kingdom districts inhabited by Georgians forcibly converted to Islam by the sword, and it was to escape further inroads by the Turk that the kingdom finally sought Russian protection a century ago.

H. H. Knox.

New York, Nov. 11, 1919.

Laying a Pipe Line in Frozen Ground

Details of Method Used in British Columbia, Where Deep Snows and a 45 Per Cent Grade Were Encountered

BY WILLIAM W. ELMER,
Mining Engineer, Portland, Ore.

INSTALLING a 10-in. pipe line on a 45 per cent grade in the Selkirk Mountains of British Columbia in the middle of winter, with from two to seven feet of snow on the frozen ground, was not always a pleasant job. The illustrations give some idea of the conditions met; yet no especial discomfort was suffered except while connecting the steel pipe flanges in zero weather. The details of the work and the costs should prove interesting to those who may have similar work to do.

The pipe line was part of a hydro-electric development, and carried water 2,088 ft. to the generating station, where a static head of 833 ft. was obtained. The first 960 ft. of pipe was laid at an angle of 23 degrees 45 minutes, or a grade of 44 per cent. The next 730 ft. was laid on a grade of 42.9 per cent, and the remainder, connecting with the penstock, on a 45.6 per cent grade.

The first 960 ft. was of spiral riveted pipe with forged steel A.S.N.E. standard flanges. Of this, 390 ft. was 9-in., 12-gage pipe, weighing 420 lb. per 30-ft. section. The next 300 ft. was 10-in., 12 gage, weighing 450 lb. per section, and the remainder was 10-in., 14 gage, weighing 330 lb. per 30-ft. length. Following this came 10 and 12 in. wire-wound, wood stave pipe, averaging 240 lb. per section.

The pipe was moved up the hill by two teams hitched to a 2-ft. sled, which carried one end of a length of pipe (see Fig. 1), the other end being supported in a similar manner. All of the pipe was hauled along the right of way by this method except about 400 ft., which it was necessary to haul up a grade steeper than 45 per cent, by single block and tackle. The time required was 14½ days for two teams and three to four men. The total cost of the distribution of the pipe along the right of way was $309, or 15c. per lineal foot.

Because of the solid flange connection, the pipe could be bent but little to conform to the contour of the ground, and it was necessary to dig a trench, as deep as 10 ft. in some places, for a total length of 640 ft. The method followed was to excavate 35 ft. of trench, then to connect a length of pipe and cover it with soil excavated from the next section. Grade was determined by a carpenter's level and a wooden triangle. When it was necessary to make the trench more than 7 ft. deep, occasional tunnels were dug to avoid shoveling snow and breaking through the frozen moss and soil. On account of the steepness of the grade, throwing the dirt out of these tunnels over the preceding length of pipe was easy. Fig 2 shows a length of pipe being lowered into one of these tunnels. The stove is made of a 100-lb. carbide can and was very successful for burning chips and trash. Before lowering the pipe, one end was connected with the chimney of the stove for about three minutes, which sufficed to melt adhering ice and snow which otherwise would have interfered with flange connections. The total excavation necessary was 361 cu. yd., which cost $868, or $2.40 a yard. In the summer time the work could have been done by contract at 96c. a yd. The material excavated was a cemented glacial wash with very few boulders larger than one-man size.

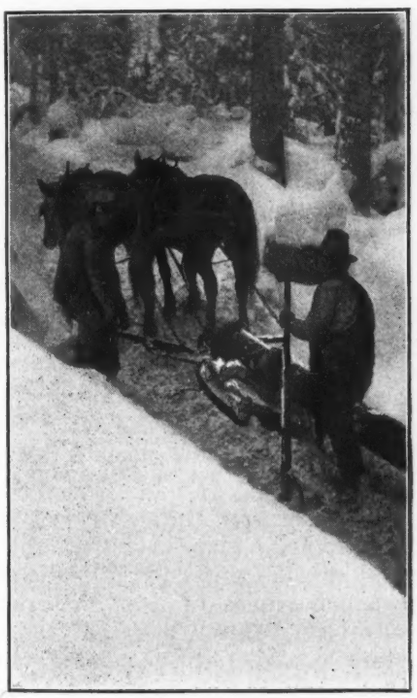


FIG. 1. HAULING 10-IN. PIPE UP 45 PER CENT GRADE.

FIG. 2. LOWERING PIPE INTO A TUNNEL.

FIG. 3. LAYING PIPE ON A TRESTLE.

Approximately 1,100 ft. of trestle from 1 ft. to 16 ft. high was constructed, using 18,320 ft., b. m., of round timbers, cut and hewed, when required, on the ground. All posts were round timbers, with sills and caps hewed on two sides. The bents were set in 10-ft. centers and, on account of almost continuous snowfall, the pipe was laid as soon as two or three had been constructed. No timbers had to be carried over 80 ft. The cost of trestle construction was $568, or $3.64 per 1,000 ft. of timber, this including cutting and hewing of timbers and construction of bents. The cost of laying the entire line was $298, or about 14c. per foot. Wages were $5 a day and board, for all men except the foreman, who received $6.

Details and Cost of a Mine Model

Materials Needed — Drafting and Construction — Line-Tracing and the Preparation and Application of Colors — Wiring and Lighting Arrangement

BY VOLNEY AVERILL,
Mining Engineer, Tonopah, Nev.

THE glass mine model recently constructed for the Tonopah Extension Mining Co. has received much favorable comment for its practical value, neat appearance, and low cost. The model is of the plan type, showing the geologic plans of twenty levels on sheets of glass placed one above the other at the proper vertical distances according to the scale of the drawing. It is viewed from the top through a glass cover. No attempt was made to show vertical sections by means of strips between the levels, because this makes the removal of glass for additions difficult, and detracts from, rather than adds to, the clearness of the completed model. The whole is in a practically dustproof case, so arranged that any sheet of glass can be removed in an instant for making additions. The illumination comes from below. The total cost of materials and labor was approximately $400. A detailed description of the construction follows:

Frame and Case

The size of the glass used is 30 x 36 in. and the scale is 80 ft. to 1 in. The total height of the frame is 48 in. This allows a 3-in. base, 8 in. for lights, 2 in. for the top caps of the frame, and leaves room for showing a vertical depth of workings of 2,800 ft. on the scale used. The width is 36⅛ in. inside the posts, leaving a play of 1-16 in. on each side of the glass. The length is 6 ft. 3 in. The reason for the great length is that after the ninth level is reached, each sheet of glass is moved forward 1¼ in., so as to follow approximately the dip of the veins. If desirable, two sheets of glass can be used to show one level.

The frame is constructed somewhat on the plan of a mine square-set, with four sets of posts, sills, and caps, all of 2 x 4 in. material. The frame of the base is of 2 x 4 in. pieces laid flat and covered with a floor of 1-in. boards. The frame is put together entirely with screws, and is arranged so that, by removing the four cross caps on top and a few of the main screws in the base, the remainder of the frame will come apart in three large sections: first the base, consisting of the floor and the four cross-sills; second and third, the two sides, each consisting of four posts, a long sill and a long cap. This feature is for disassembling for transportation. The frame was completed as far as described and then painted with two priming coats and two coats of white paint.

The runners for the glass are of ¼ in., square, cold-rolled steel 2 in. shorter than the frame, to allow for the insertion of panels in the ends of the frame. They are drilled with ⅛-in. holes in such a way that the holes in alternate bars come opposite each other, those of the other set being about ½ in. to one side—this is to allow for countersinking the nuts on the opposite side of the posts where levels are close together. The posts were first carefully marked at the proper intervals with the help of a long steel straight-edge, then the bars were each in turn clamped to the posts at the marks; holes were drilled through the posts through the holes already in the bars and countersunk on the opposite side of the posts, and the bars bolted in place. The small bolts for this purpose were made in the machine shop, the nuts were purchased, and washers from copper rivets were used. The carpenter would have preferred to use wood screws to hold the bars in place, but I do not think that this would give as rigid construction, or that they could have been put in place with as much accuracy. The holes in the posts containing the nuts and washers were covered with beveled strips. I have seen models in which the glass is supported in notches sawed in the posts, but this is very unsatisfactory, because the wood between notches splits out; also, the glass is more likely to be broken in handling.

After the twenty pairs of bars were in place, together with an extra pair for a glass over the lights, 8 in. above the floor, the sides and ends of the case were closed with wooden panels of 1-in. material, which had previously been painted like the frame. The side panels were placed tightly against the runner bars and serve to guide the glass. They are held in place by means of small moulding and round-head screws. The end panels are provided with brass knobs and small iron turn-buttons to make them readily removable. The latter were not put in place until the final coat of paint had been applied to the outside of the completed case. The top openings were provided with mouldings placed so that a pane of glass cut to fit would lie just flush with the top of the side and cross caps. The carpenter wanted to tongue and groove the side panels all round and glue them into the frame. This would have been a great mistake, because even the best seasoned lumber is subject to great shrinkage in this climate, and, if the edges of the panels had been held fast, they would, in the course of a few months, have split from top to bottom. The shrinkage is taken up at the edges in the present arrangement and is covered by the moulding.

The plans on the glass show the geology in detail, the veins, faults, and rock formations being in colors. The veins are shown in red, the faults in blue, and

the rock formations in various colors, purple, yellow, green, brown, and orange. On the lower sheets of glass the yellow and brown look a great deal alike, because of the superimposed color of the many thicknesses of glass. Small black crosses are placed on the yellow on all levels to overcome this difficulty. Conventional signs such as crosses, dots, circles, and like markings, could probably be used with as good results as colors to represent the different rocks. In either case the band of color or signs should be made as narrow as possible, so that the details on the lower levels will not be obscured.

The glass used is "double-strength" or "picture" glass, and is about ⅛ in. thick. Plate glass is thicker and stronger, but it would absorb too much light and would not allow of the close spacing of levels. Ordinary window glass is so thin that, in large sheets such as are used, it is likely to break in the handling necessary to make additions to the model. The glass used is slightly curved, due to the fact that it is blown as a cylinder and allowed to flatten while hot. The convex side should be turned up so that the weight of the glass will tend to correct the curvature and make the sheet more nearly flat.

Before starting work on the glass it is washed perfectly clean and free from grease, allowing a coat of the cleansing preparation to dry and then rubbing it off. It is very important to have the glass free from all traces of grease. Then the glass is placed in the proper position over a map of the level and the lines and geology are traced through. The property lines are first traced through for each level with a heavy line, made by setting the pen for a finer line, drawing several fine lines close together, and then joining them. Each glass is allowed to dry again after the property lines have been placed on it. The posts are represented by small circles drawn with an ordinary swivel pen. This is difficult to manipulate on the glass at first, but care in holding it vertically overcomes the difficulty. Next the levels are outlined on each glass with an ordinary pen, and it is allowed to dry again. The faults are represented by blue pen lines, and the colors for the rocks put on with a brush, a period for drying being allowed after each color is applied.

The colors are all made up from oil tube paints mixed with Japan dryer. With this type of color, when dry, the maps may be washed if necessary. This is a distinct advantage over inks if the model ever becomes dusty or dirty. Another thing to consider in the use of inks is the fact that the hand is likely to rub off one part of the map while working on another, even after the ink is dry. Gold size may be used for mixing the colors, but it darkens the colors and does not dry as quickly as the Japan drier. The colors are mixed very thin, so that the shade is soft and they are nearly or quite transparent when applied to the glass. Some colors give better satisfaction in this respect than others, for example, the color magenta may be mixed so thin that it is transparent, and it will still give an excellent shade. The time for drying varies from about twelve hours for the black to half an hour for the blue. The difference is probably due to the difference in the proportions of the tube color and the Japan drier used to give the desired results. A large proportion of the black must be used to give a satisfactory color, whereas a very small proportion of Prussian blue is necessary. No oil or turpentine is used. Turpentine may be used, but the drier gives better results when used alone. However, turpentine is very useful for cleaning off the pen, when difficulty is found in making the mixtures run off freely.

Lights and Costs

The wiring for the lights is carried under the floor to sockets of the sign-board type setting almost flush with the floor. Eight lights are used in the present model, some 100-watt nitrogen, and some 60-watt tungsten. The number of each may be varied to give the proper intensity of illumination. Eight inches above the floor is a sheet of glass covering the entire area of the floor. This glass is coated with a mixture of flake white and gold size. The light through the coated glass is soft and pleasing. Ground glass might give a still better effect, but the coated glass is cheaper and is satisfactory. Costs were approximately as follows: Designing and work on glass, $200; carpenter and painter, $60; steel bars, $8; machine shop, $13; electrician, $6; lumber, $8; glass, $50.

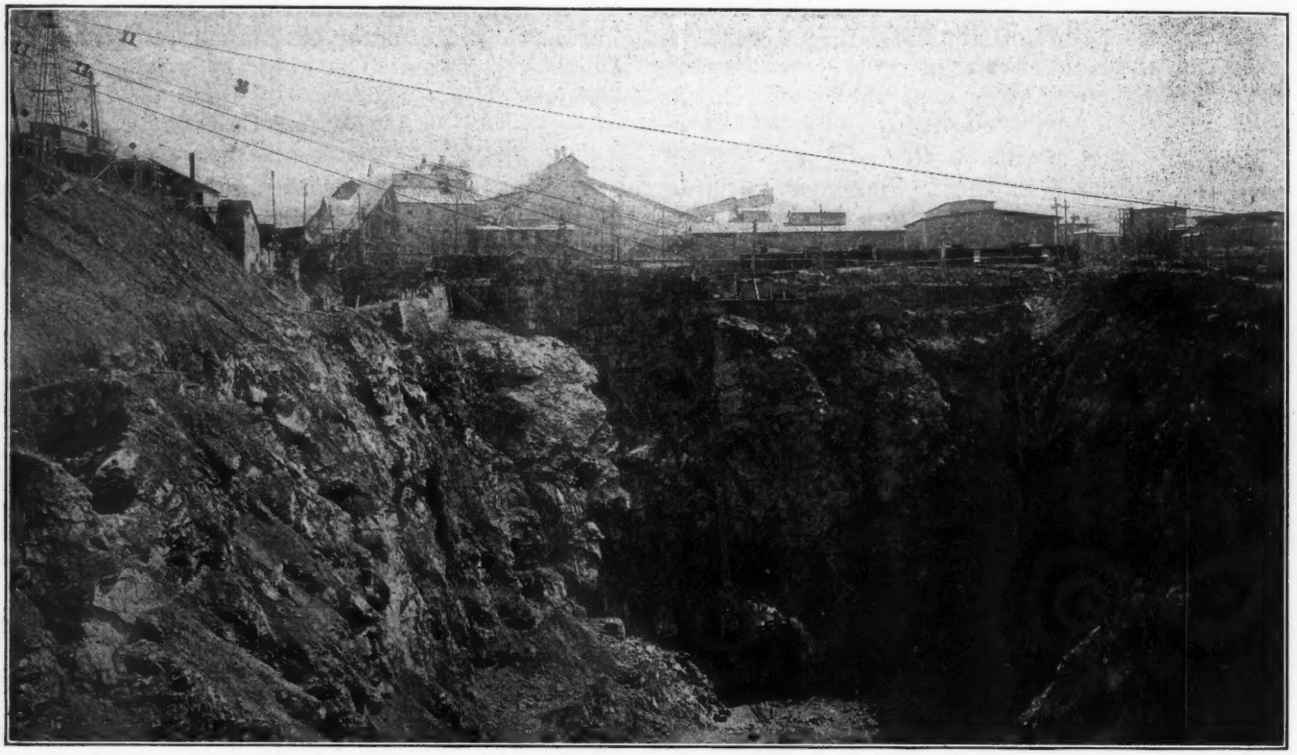
I have no figures on paints and lights, but these would bring the total to a little over $400. This has been considered low for the satisfactory results obtained.

Debris Dams on North Yuba River, California

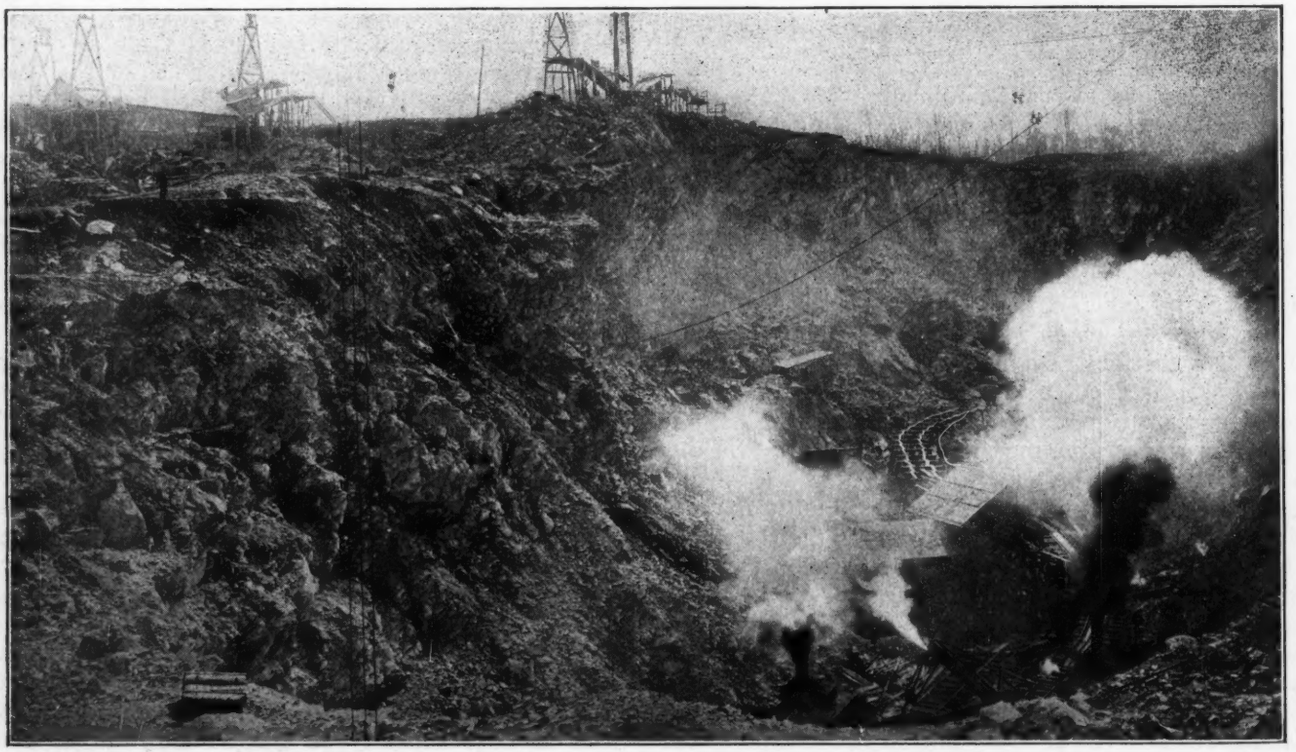
A concrete dam on the North Yuba River at Bullard's Bar, northwest of Nevada City, Cal., was completed early in October, having been constructed for the purpose of impounding debris from hydraulic mining operations. The dam, which is of the "constant-angle arch" type, was designed by L. R. Jorgensen, of San Francisco, and is 160 ft. long and 33 ft. high. It is a permanent structure, capable of permitting a 20-ft. flood stream to pass over its crest, and will prevent the debris bed which settles above it from being washed farther down the river. The storage capacity is computed to be 1,000,000 cu. yd. The cost of the structure was $30,000, or an expense of 3c. per cu. yd. of gravel.

As a result of the construction of the dam already mentioned, a second dam, 5,900 ft. below the other and above the Colgate power house of the Pacific Gas & Electric Co., will be started soon. This second dam, which will be 170 ft. high and will have a storage capacity of 50,000,000 cu. yd. of gravel, will allow additional hydraulic mines on the North Yuba watershed to operate within the provisions imposed by the California Debris Commission. The construction cost is estimated to be about $600,000. The power rights of this dam have been acquired by the Pacific Gas & Electric Co. At a later date it is possible that a third dam farther up the river, with the same storage capacity as the second, will be constructed.

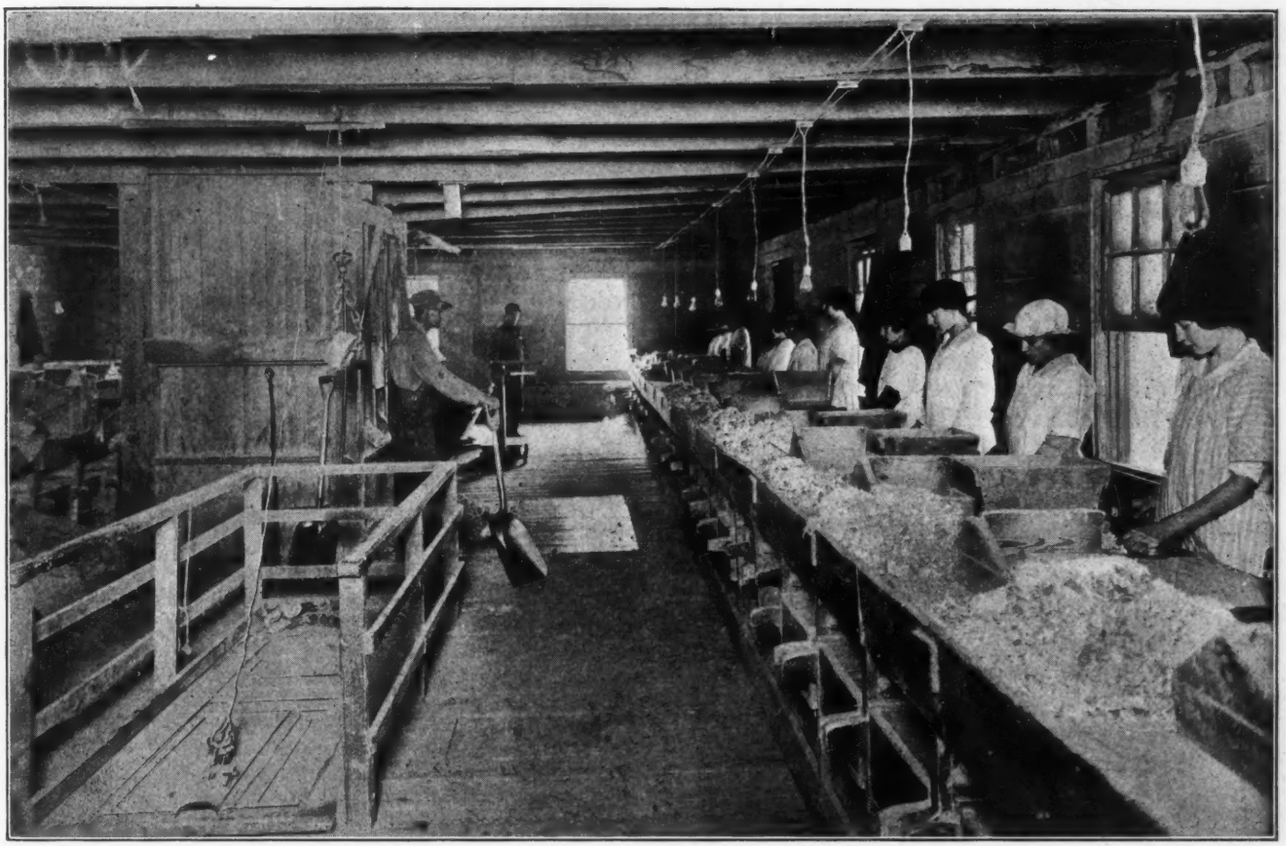
Asbestos Mining at Thetford Mines, Quebec



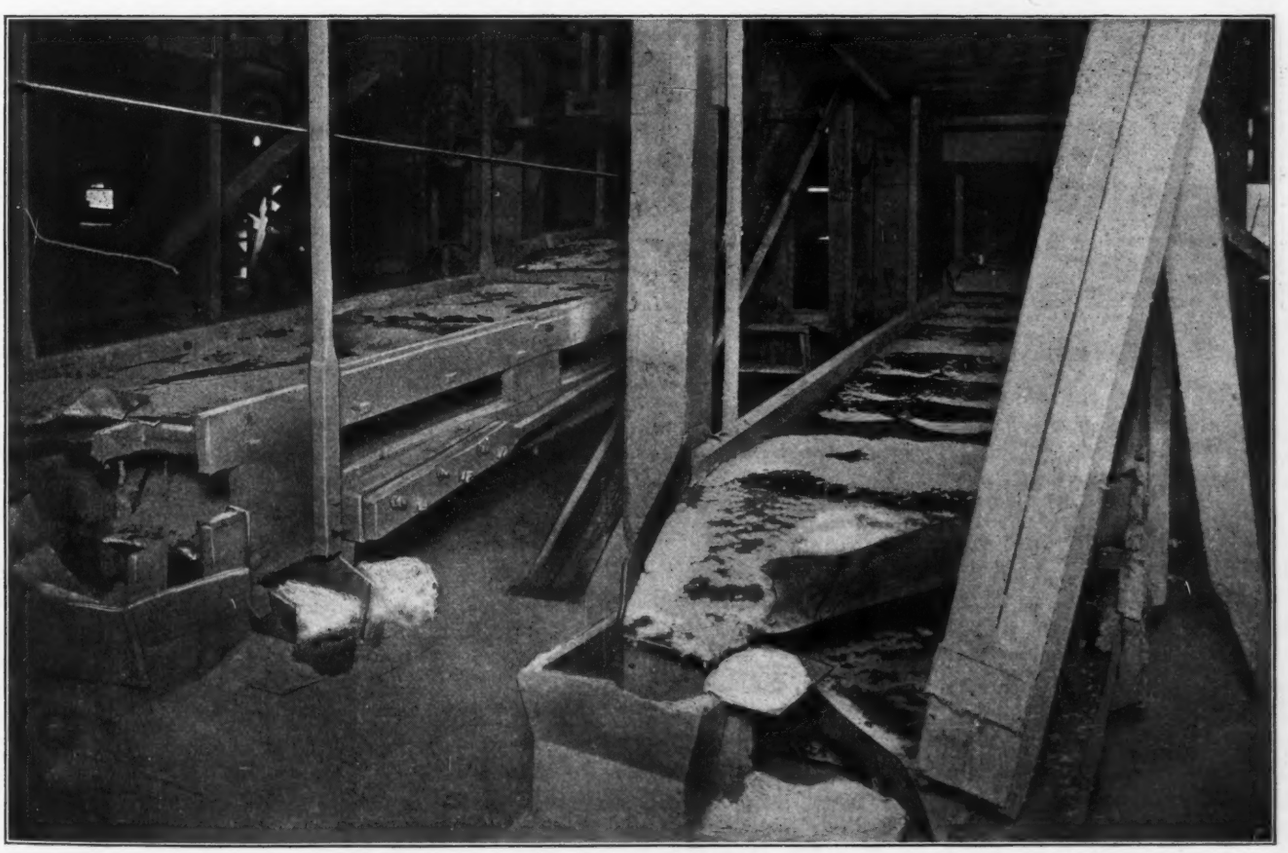
VIEW OF THE MINING PIT OR GLORY HOLE. THIS PIT IS ABOUT 300 FT. DEEP. SOME IDEA OF THE DEPTH CAN BE JUDGED BY THE SIZE OF THE MAN AT THE BOTTOM.



A VIEW OF ONE OF THE PITS, SHOWING THE SHOVELS AT WORK



WHEN THE ROCK COMES FROM THE BREAKERS THE BETTER PART IS HAND PICKED, AND THE BEST QUALITY THEREBY OBTAINED. THIS PROCESS IS CALLED "COBBING."

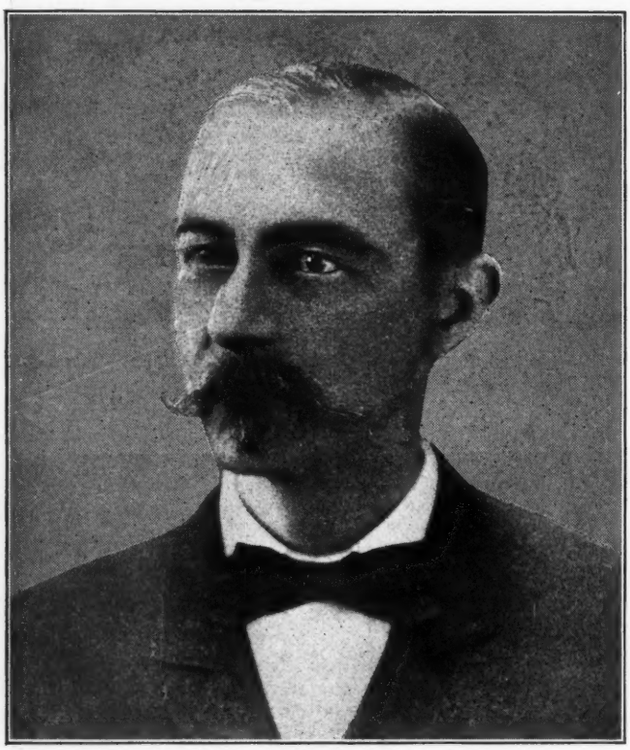


THE SIFTING PROCESS, SHOWING THE ASBESTOS BEING SIFTED OVER SCREEN.

Franz Fohr

(A BIOGRAPHICAL SKETCH BY W. R. INGALLS)

ON JULY 27, 1919, there passed away a simple, unassuming gentleman, who through his life allowed his intense modesty to keep him in the background and during his later years effaced himself so thoroughly that few of his old acquaintances knew aught of him. Yet he was one of our accomplished metallurgists, who did good work in the practice of his profession, and lived an upright life, and it will be a pleasure to his old friends to have a record of him in the annals of the mining and metallurgical industry. Now that he is no longer with us, Franz Fohr cannot plead to be overlooked, and those who fondly remember him will be gratified by his receiving his due.



FRANZ FOHR

Franz Fohr was born on Sept. 7, 1838, in Mannheim, Germany. Of his ancestry, education, and early career we know scarcely anything. We do not even know just when he came to America, or what led him hither. The first record of his professional work in this country, found among his papers, shows that from July, 1870, to Jan. 1, 1872, he was superintendent of the Newark Smelting and Refining Works, then owned by Edward Balbach & Son. At that time the Balbach works at Newark, established in 1850, and the Selby works at San Francisco, established about 1866, were the only important silver-lead refineries in the United States. Mr. Fohr may have been associated with the Balbachs for some time before he became superintendent of their plant, or he may have come from Germany only a short time previously. At all events, it is certain that he was at that time an experienced and accomplished metallurgist, for after leaving Newark and going to San Francisco he soon formed some kind of a connection with Thomas H. Selby & Co. Early in 1874 the Selby firm sent him to New York to procure information respecting the manufacture of white lead. His engagement in New York terminated on Jan. 31, 1875.

During 1875 Mr. Fohr spent some time at Silver Islet and in the Lake Superior copper region, but of his work there no record remains. In the latter part of 1875 or early in 1876 he associated himself as metallurgist with the Boston Silver Co., operating at Saint John's, Summit County, in which William L. Candler, of Boston, was the moving spirit. That company was developing its mine in 1875. At the end of that year it "had about 800 tons of ore on hand, about three-fourths of which is dressing ore, to be concentrated in its very systematic establishment and to be smelted into pig-lead." Evidently Mr. Fohr was engaged for the latter purpose. Henry A. Vezin, erudite and painstaking, was the mechanical engineer for the company. In the fall of 1876 Anton Eilers took his family for the first time so far west as Denver, and Mr. Fohr went with them. I do not think that Mr. Eilers had any connection with the Boston Silver Co., save possibly in a consulting capacity, but he visited Saint John's, and the enduring friendship among Eilers, Fohr, and Vezin, which terminated only with their deaths, dated from that time.

I ought to know more about the association at Saint John's for only a few years later I was under the tutelage of the distinguished and lamented Vezin, who never tired of relating the history of that famous if not very successful enterprise, and also I knew Mr. Fohr from 1886 onward, but memory is an evanescent thing. My recollection is that a lot of excellent engineering and metallurgical work was done there without there being any great foundation for it. At all events, Mr. Fohr remained with this company nearly three years and then went to take charge of the smelting operations of the Horn Silver Mining Co. at Frisco, Utah, which he conducted from Aug. 1, 1878, to Aug. 1, 1879. This was the time of the height of the boom at Leadville, and it was but natural that Mr. Fohr moved promptly to the greatest silver-lead mining and smelting district. He became part owner in the Malta Smelting Co., below California Gulch, and had charge of its plant. In 1881 he became superintendent of the Harrison Reduction Works of the St. Louis Smelting and Refining Co., and retained that position until his retirement from active work. I do not remember just when his retirement took place, but my recollection is that it was during the '90s. He then moved to New York and kept a little office here, in company with Faber du Faur, one of his early friends. Mr. Fohr went religiously to his office every day, spending a few hours there, reading and absorbing the

general information for which all his life he was so greedy.

On his seventy-fifth birthday, which he celebrated with the Eilers family at Sea Cliff, Mr. Fohr told them that in early life he had made up his mind to divide his years of life, twenty-five years to study, twenty-five to accumulating money, and twenty-five to enjoyment. He then remarked that, having passed seventy-five, he was free to do anything he liked. I do not think that he conformed exactly to that schedule, but he was methodical enough in his habits to develop such a plan and follow it generally.

Mr. Fohr was a tireless student, both in his professional work and outside of it. Indeed, with his calm philosophy he was able to dismiss the affairs of the works when he left them for the day. He had them so well organized that he felt no concern about them ever. I sat at the same table at mess with him for two years, perhaps, and do not recall his ever talking "shop." He preferred to talk about politics—in the broad sense—art, music, literature, and history.

His knowledge was profound, his memory wonderfully accurate, and woe to any one who challenged his statement of facts. So careful was he in discriminating between wheat and chaff, that we used to say laughingly that he would not accept anything as being truly news of the day until he had the authority of the London "Times," the weekly edition of which he read religiously.

In the latter portion of his life it had been his custom for many years to go to Sea Cliff every Sunday, spending the day alternately at the houses of Anton and Karl. It was at the latter's that he died, July 27. He had reached a ripe old age, and had outlived nearly all of his early associates of his own generation. Of that famous galaxy of metallurgists that created the art of silver-lead smelting in this country between 1870 and 1885 he was practically the last. The seniors of the present time do not hark back to the pioneering stage, but belong to the early part of the engineering stage which followed.

Mr. Fohr's modesty and his disinclination to form a wide circle of friends prevented him from attaining the fame that might easily have been his if he had cared for it. Rather, he chose to have only a few friends, but to them he was one of the closest and most loyal they ever had, and to their children he soon became and always remained "Uncle Fohr."

Oil-Well Activity in California.—Reports filed with the State Oil and Gas Supervisor of the California State Mining Bureau during the week ended Sept. 13, 1919, show seventeen new wells, making a total of 454 reported since the first of the year. Eighteen wells were reported ready for test of water shut-off and seventeen deepening or redrilling. Six abandonments were reported. For the week ended Sept. 20, 1919, there were twelve new wells, making a total of 466 reported since the first of the year. Twenty-five wells were reported ready for test of water shut-off, and thirteen deepening or redrilling. Five abandonments were reported.

Chino Copper Company

The thirty-second quarterly report of the Chino Copper Co., covering the third quarter of 1919, states that the gross production of copper contained in the concentrate from milling operations for the quarter was 10,427,395 lb., or an average monthly production of 3,475,798 lb. The total amount of ore treated for the three months was 425,350 tons, equivalent to an average of 4,623 tons per day. This daily average is 216 tons more than that milled for the second quarter of 1919. The average assay in copper of the ore treated for the third quarter was 1.9024 per cent, compared with 1.8327 per cent for the second quarter of 1919. The ore milled during the third quarter was less favorable to concentration than the ore treated during the second quarter, on account of its high carbonate and silicate content. The recovery per ton of ore milled for the third quarter was 24.515 lb. of copper, as compared with 26.28 lb. of copper for the second quarter of 1919. There were produced 28,094 dry tons of concentrate, averaging 18.558 per cent copper, compared with 26,830 dry tons of concentrate, averaging 19.645 per cent copper, for the second quarter.

The cost per lb. of net copper produced from milling operations for the third quarter, after allowing for smelter deductions and including depreciation, was 15.70c., compared with 14.16c. for the second quarter of 1919. The increase is due largely to wage advances which became effective near the beginning of the quarter. The cost figures shown do not include any charge for Federal income or excess-profits taxes, nor do these costs take into consideration miscellaneous income. Gold and silver to the amount of $3,701.55 was paid for during the third quarter.

The financial results of the company's operations for the third quarter are as follows:

Net income from copper production (only)	$677,961.93
Miscellaneous income, including payments for precious metals	24,422.66
Total	$702,384.59
Distribution to stockholders	652,485.00
Surplus after distribution to stockholders	$ 49,899.59

The above figures are based on a carrying price for copper of 22.478c. per lb. for the third quarter, calculated in the usual manner by inventorying unsold copper at 13½c. per lb. The figures for the second quarter of 1919 were based on a price for copper of 14.599c. per lb.

During the third quarter there was removed by steam shovels at the Santa Rita mine a total of 1,166,389 cu. yd. of material, equivalent to an average of 388,796 cu. yd. per month, compared with a total of 1,084,668 cu. yd. of material during the second quarter of 1919, or an average of 361,556 cu. yd. per month. Of the total material removed during the third quarter, 893,353 cu. yd. were stripping, the remainder being equivalent to 541,889 tons of ore of an average grade of 1.746 per cent copper, according to mine sampling and assaying. The difference between the tonnage mined and the tonnage milled during the third quarter is due to oxidized and partially oxidized ore which was sent to the mine stockpiles.

Small Compressors Driven by Oil Engines Becoming Popular in the West

BY GEORGE J. YOUNG

A single-stage air compressor driven by an oil engine of the semi-Diesel, valveless, two-cycle type, in tandem with the air cylinder, has become popular in several mines in Nevada, even where electric power is available. Four machines of this type are in use in the Tonopah district, three of them at the Midway mine and one at the Gypsy Queen. The initial installation at the former superseded a steam-driven compressor, and the oil-driven unit was so satisfactory that two more were installed at another shaft.

One of these compressors, supplying air for four jackhammers, consumes 35 to 40 gal. of oil per eight-hour shift, which, at 8 to 9c. per gal., amounts to from $2.80 to $3.60. The repairs on a machine which has been in use for four or five years have been moderate, the principal ones being reboring of the combustion cylinder and replacing the Diesel piston. Adjustment of the cooling water and lubricating oil for both cylinders is the principal operating detail which requires attention. After heating the ignition apparatus with a blow torch, the machine is easily started with compressed air from a small auxiliary gasoline-driven compressor.

An idea of the construction and cost of the machines may be obtained from the accompanying table, made up from data given in a manufacturer's catalog.

SEMI-DIESEL TANDEM-TYPE AIR COMPRESSORS

Piston Displacement, Cu. Ft.	Developed HP.	Weight Per Cu. Ft. Piston Displacement, Lb.	Approx. Costs Per Cu. Ft. Displ.	Sq. Ft. Floor Space Per Cu. Ft. Displ.	Fuel Oil Per Hr., Gal.	Lubrictg. Oil For Cyl. Pt. Per Hr.	Water Supply
133	19.5	41	$15	0.30	2.8	1	1.2
196	27	46	14	0.25	3.3	¾-1	to
309	47	43	13	0.25	4.5	¾-1	1.5
370	57	50	15	0.27	5.2	1-1¼	gal.
507	77	66	18	0.25	7.0	1¼-1½	per hp. hr.(a)

(a) For both compressor and Diesel cylinders.

One engineer states that, from his experience, the repair cost is excessive and that a good mechanic must be available. Others report that the repairs are not prohibitive and that if proper attention is given, and adjustments are intelligently made, the unit will operate satisfactorily. Operators are, however, somewhat difficult to secure, and a man who understands the gasoline engine is not always satisfactory. A substantial foundation is almost a necessity to prevent excessive vibration.

Machines of this type are suitable for the initial development of prospects, but in larger operations their economical use is open to question. No other power would be required on a small property if a hoist operated by compressed air were installed. When a compressor supplies air for both hoisting and drilling, an extra large receiver is, of course, desirable.

Ray Consolidated Copper Co.

The thirty-third quarterly report of the Ray Consolidated Copper Co., covering third quarter of 1919, states that the gross production of copper contained in concentrates for this quarter is 11,534,747 lb., or an average monthly production of 3,844,916 lb. In addition to the copper derived from concentrating ores, a total of 136,222 lb. of copper was contained in ores sent direct to the smeltery. This, combined with the copper contained in concentrates, brings the total gross production from both sources for the quarter up to 11,670,969 lb., as compared with 11,667,701 lb. for the previous quarter. During the quarter there was milled 392,800 dry tons, averaging 1.828 per cent copper. This tonnage corresponds to a daily average of 4,270 tons, as compared with 4,302 tons for the previous quarter.

The mill extraction for the quarter was 80.33 per cent of the total copper contained in the concentrating ores, as compared with 79.06 per cent for the previous quarter. The underground development for the quarter was 2,606 ft., making the total development to date 694,671 ft. The milling cost for the quarter was $1.33 per ton, as compared with $1.23 for the previous quarter, both exclusive of income and excess-profits taxes. The average mining cost of ore milled for the quarter was $1.83 per ton, of which 6.46c. was the cost of coarse crushing, leaving the net mining cost $1.76 per ton, as compared with $1.58 for the previous quarter, both exclusive of income and excess-profits taxes. The average cost per lb. of all net copper produced for the quarter was 15.53c. This figure does not take into account credits for the value of gold and silver, or for miscellaneous income, and compares with a cost of 14.64c. for the previous quarter.

The costs detailed include a charge of 15c. per ton of ore treated for the retirement of mine-development expense, but are exclusive of estimate of Federal income and excess-profits taxes. The higher cost per lb. of copper produced is due to a wage increase of 75c. per shift for all classes of employees, which was put into effect July 16, 1919. Miscellaneous income for the quarter, including net receipts from gold and silver produced, amounted to 1.999c. per lb. The financial results of operation for the quarter are as follows:

Net operating profit	$706,070.59
Miscellaneous income	226,076.44
Total	$932,147.03
Disbursements to stockholders	788,589.50
Net surplus for quarter	$143,557.53

The average carrying price for the quarter was 21.77c., as compared with 14.80c. for the previous quarter. The output for the quarter was approximately 50 per cent of normal, and is practically identical with the production of the second quarter. The upkeep of mine and mill has been properly attended to, and both plants stand ready to operate at full production on short notice.

Carmen Nol Gusher was brought in by the Standard Oil Co. in the Elks Hills district, section 36, about ten miles northeast of Taft, Cal., on Oct. 7. The oil goes 30 to 40 ft. above the derrick, flowing from ten thousand to fifteen thousand barrels daily. The company has been drilling for six months, using a 6-in. drill casing and 10-in. mouth casing. The crown was not disturbed by the blow-off. The gusher lies one mile east of the gasser brought in last June. The oil is of high gravity.

PETROLEUM SECTION

Engineering Notes and Equipment Details
Production Statistics — Progress
in Important Fields

Southern Pacific Loses California Oil Lands

U. S. Supreme Court Reverses Finding of the Circuit Court and Orders 6,000 Acres Returned to the Government

THE U. S. Supreme Court in Washington handed down a decision on Nov. 17 cancelling the patents for 6,000 acres of California oil lands, valued at $10,000, which were alleged to have been obtained through fraud by the Southern Pacific Co. The decision reverses the decree of the Federal Court, which dismissed proceedings instituted by the Government to have the land, which is situated within naval oil reserve No. 1, returned to the Government. The contention of the Government was that the company, at the time the patents were issued, in 1904, under a railroad land grant which reserved mineral lands, was aware of the fact that the lands were valuable for oil, although alleged false affidavits to the contrary were filed. The Federal District Court, in ruling on the suit, held that though there had been no actual discovery of oil on the lands, the surrounding conditions indicated that it was was valuable for oil, which in turn was reversed by the Circuit Court of Appeals, which body is now finally reversed by the Supreme Court.

In rendering the opinion, Justice Van Devanter said the officials of the railroad company were not acting in good faith, and were "attempting to obtain the patent by representing that the lands were not mineral when they believed the fact was otherwise." Continuing, the Justice said: "After considering all the evidence, we think it is adequately shown that the lands were known to be valuable for oil when the patent was sought and obtained, and by this we mean that the known conditions at that time were such as reasonably to engender the belief that the lands contained oil of such quality and in such quantity as would render its extraction profitable and justify expenditures to that end."

The company introduced evidence to the effect that a general land office agent examined the lands and reported them as non-mineral. The court said that this report was made in another connection, and was not considered by the Government in approving the company's selection. The decision states: "It did not relieve the company from showing that the lands selected were not mineral, nor did the company understand that it had any such effect. Besides, if the report could be considered here it would be without any real evidential value, for it appears from testimony given by the agent at the hearing that he was not a geologist or familiar with oil mining, and that his examination of the lands was at best only superficial."

The area involved amounts to about 6,000 acres, situated in the Elk Hills region of Kern County, near the town of McKittrick. The lands are declared to be part of a grant made by the Government to predecessors in interest of the Southern Pacific Co. in 1866, in return for the promised development of the region. The patents to the lands were not perfected until Dec. 12, 1904. The suit for the return of the lands to the Government was started in 1910, when it was determined that the lands were partly mineral, on the basis that the original grant covered non-mineral lands only. Government geologists came to the conclusion that the lands were in the Taft Presidential withdrawal order of 1912, and they were thereby added to the naval reserve. It is maintained by experts for the company that the lands have little present or potential mineral value, and the oil content has only been proved within the last year. The Government experts oppose this opinion and hold that the lands have a high potential value.

Oil Fields of England, Limited

First British Company Licensed by the Government to Bore for Oil in England. To Develop 5,000 Acres in Nottingham

THE first or statutory general meeting of the members of Oil Fields of England, Ltd., held on Oct. 30 and reported in the "Financial Times," London, contained an interesting review of the present status of the development work being done in England. The chairman, William Ivey, said that this company was the first British company formed in Great Britain to bore for oil in Great Britain itself. There have been plenty of oil companies, and millions of dollars have been raised in Great Britain for the development of oil fields, but up to the present all of that money had been subscribed for development work abroad. In this instance, the money had been subscribed with the definite object of proving whether oil existed in commercial quantities on the Kelham estate in Nottinghamshire. This company holds the first British license granted by the British government for that purpose. Lord Cowdray and his staff, who have already been drilling for oil in several counties, do not represent a British company, but have been acting as an advisory staff to assist the government in proving whether oil existed in commercial quantities.

In regard to the prospects of the company, the chairman stated that the company's future was speculative, but only in regard to the amount of oil

that would be found. The existence of oil has been proved on the Kelham estate. In regard to obtaining oil in commercial quantities, nothing more is known at the present than was not apparent three months ago. The capital of the company amounts to £250,000, and the area about 5,000 acres. The chairman also stated that it is intended to proceed without delay in drilling down to the oil strata. Therefore, some of the material necessary had been ordered in America, owing to the fact that delivery of the entire equipment could not be obtained in Great Britain.

Anglo-American Oil Company to Build Refinery in England

According to advices received from London and printed in the "Boston News Bureau," the Anglo-American Oil Co. is to build a refinery in England. If this step is to be taken, it is because present British laws exempt from certain taxation gasoline made in England. The construction of a refinery at Swansea by the Anglo-Persian Oil Co., 65 per cent of which is said to be owned by the British government, the capacity of which, when completed, is estimated will be 30,000 bbl. of crude oil a day, has resulted in forcing other oil companies to refine oil in England.

The Anglo-Persian development was followed by E. L. Doheny, who organized the British-Mexican Oil Co., in conjunction with the prominent British industrial and shipping interests. The British-Mexican Co. is to build a refinery on the Manchester Ship Canal in conjunction with its activity in distributing oil products throughout Great Britain and Continental Europe. It has been reported that a considerable amount of stock of the Anglo-American company has been purchased for English account. English industries realize that control of oil means control of shipping, and, therefore, appreciate the great extent to which oil companies will be in a position to share in the marine fuel-oil business.

Petroleum Possibilities in British India

According to an article in "Indian Engineering," and reprinted in the "Board of Trade Journal," London, Oct. 16, 1919, a theory is being discussed in British India that oil beds exist continuously along a belt stretching from Burma in the east to Rumania in the west. Should the fact be eventually established, a discovery of the highest importance will have been made, for the belt will lie wholly on the Indian side of the Himalayas.

At present, however, only uncertain indications have been found, the latest of which have been discovered by Mr. Middlemiss, who is now superintendent of the Mineral Surveys of Kashmir. He has not so far actually found oil in Jammu Province, but has located geological conditions pointing to the existence of a natural reservoir of a type giving good promise of a store of oil, being in all respects similar to oil-yielding structures in the neighboring Rawal Pindi Plateau. In the latter region oil had long been known to be present, but efforts to obtain it in quantity were unsuccessful till the Khaur oil field near Pindigheb was at last located.

Discussing the general question of the occurrence of oil beds along the sub-Himalayas, Mr. Middlemiss says: "The whole of the belt of stratified rocks in Jammu embraces a section of the sub-Himalayan rocks of Tertiary age from Eocene upward, which are identical in composition, age, and lithological characters with those of the petroliferous series in the neighboring Rawal Pindi district. They are also identical in age with, but differ in some particulars lithologically from, the petroliferous series in Assam and in Burma, and also in the newly-discovered fields in Persia. In fact, they form with these known petroleum-bearing areas what is really one continuous but intricately winding belt of deposits belonging to one comprehensive geological epoch, that stretches from Persia on the one hand to the extreme south of Burma on the other. It is also equally true that in general characteristics and in age these rocks exposed in Jammu agree with those of a great proportion of the more distant successful oil fields of the world, notably with those of California, Peru, Russia, Rumania, Galacia, and Sumatra."

Notes From the Texas and Louisiana Oil Fields

Taxes paid by oil companies for last quarter will be over $500,000 on gross receipts. Some of the largest taxpayers are: Texas Co., $81,866 on sales of $5,457,747; Gulf Production Co., of Houston, $74,876 on sales of $4,991,755; Magnolia Co., of Dallas, $60,542 on $4,036,170; Humble Oil & Refining Co., of Houston, $45,569 on $3,037,920; Texas Pacific Oil & Coal Co., of Ferber, $33,106 on $2,270,083; Prairie Oil & Gas Co., of Dallas, $21,292 on $1,419,518.

The oil and gas department of the Railroad Commission is endeavoring to standardize its records, in order to make few changes necessary, and make it easier for pipe-line companies to conform to the requirements. In carrying out this plan the following ruling has been drafted, to go into effect on Dec. 6: "All maps or sketches of any kind of any tract or tracts of land filed with the oil and gas department of the Railroad Commission must be drawn on a scale of 500 ft. to 1 in., unless the area involved is less than two acres, when the scale must be 50 ft. to 1 in."

The Prime Oil & Refining Co., of Dallas, was recently incorporated with a capital stock of $500,000. The incorporators are: C. E. Lang, Wichita Falls; Mills Bennett, Houston; and Howard Paschal, Asbury Park, N. J. The Texas Oil Corporation, of Dallas, was incorporated with a capital stock of $150,000. The incorporators are: J. J. Simmons, C. C. Quillan, W. S. Blair, and H. E. Halaby, all of Dallas.

The Yount Lee Oil Co., of Sourlake, Tex., has filed suit against Land Commissioner, J. T. Robinson, to test the constitutionality of the Texas Oil and Gas Permit Law and to attack the validity of a permit recently granted to W. M. Fleres and M. K. Fletcher, of Beaumont, on oil land in Liberty County. This

is the first of several suits. The land in controversy is valued at $3,000,000.

The Homer field, in Claiborne Parish, La., is showing great activity. Among the largest wells are the Swan No. 3, of the Rowe Oil Corporation, which flowed unchecked at the rate of 15,000 bbl. daily from 2,100 ft., when first drilled in; and the Oaks Farm well, of the Standard Oil Co., which gaged 12,000 bbl. per day when first brought in.

An injunction, asked for by Isadore Leon against A. S. Moss, N. E. Burke, and J. E. Pitts, trustees for the unincorporated joint-stock association called the M. & P. Burk Oil Co., has been granted by Judge Ewing Boyd, of the 55th District Court, Houston, Tex. The plaintiff claims the agreement was entered into by the terms of which the defendants were to deliver to him 700 shares of stock of this company for $478,333, but which they now refuse to do. The plaintiff further claims that the stock is now worth $750,000, and is suing for the stock or the difference in value, about $270,000. The stock is held in the City National Bank, of Wichita Falls, and the court has granted a temporary injunction restraining the defendants from transferring the stock to others, and the bank from making delivery to the defendants.

In Brazoria County, Tex., the West Columbia field production for the first week in November was about 20,000 bbl. daily. The larger producing companies were: Humble Oil & Refining Co., 7,500 bbl.; Texas Co., 6,000 bbl.; Crown Oil & Refining Co., 3,500 bbl.; Gulf Production Co., 3,000 bbl. New wells being tested are Texas Co.'s Hogg Nos. 18 and 28; Gulf Production Co.'s Hogg No. 1; Sun Co.'s No. 2 Robinson.

The Sinclair Consolidated Co.'s No. 9 Jackson well, on Damon Mound, was recently completed and is now producing 150 bbl. daily. The Humble Oil & Refining Co., at Stratton Ridge, is drilling at 2,500 ft. depth. Other work in this district is being done by the Texas Co., Freeport Sulphur Co., and Castell Oil Co. The Freeport company is sidetracking a well at 1,100 ft. In Coleman County, Tex., the Texas Best Oil & Refining Co. will build a refinery at Santa Anna, with a capacity to be 2,000 bbl. daily.

Harris and Jackson Counties

A new refinery on the Houston Ship Canal will be constructed immediately after Jan. 1 by the Marland Refining Co., of Ponca, Okla. A tract of 1,830 acres on the channel, eight siles south of Houston, has been secured at a price stated to be $525,000. The site has exceptional transportation advantages, both by rail and water, and is 30 ft. above tide water.

The case of Adolph Golman vs. Invincible Oil Co. and twenty-eight others was to be heard on Nov. 10, in the 18th District Court, before Judge J. D. Harvey. The suit is over 160 acres in the Landslide tract of the Humble oil field, from which oil previously taken out is said to be worth $45,000,000. Golman claims the title on the ground that he received a land grant from the state. The defendants claim this grant was cancelled and that they bought the land from the late George H. Hermann.

Drilling in the vicinity of Edna, in Jackson County, is now under way. The Texas Co. is drilling in the La Ward section; the Vanderbilt Petroleum Co. is rigged up and ready to drill on Coop farm, twelve miles south of Edna, and the Coastline Oil Co. is now down over 500 ft. in a well on W. A. Calhoun tract, two miles south of Edna.

Developments in Other Fields

The Gulf Refining Co., in Jefferson County, announced through the local manager that oil shipments from here during October totaled 2,305,163 bbl. by water; of this 803,028 bbl. was foreign, and the rest coastwise. This breaks all previous records. In Nelms-Marvin well on the McCrea ranch is 1,100 ft. deep; the Waxa-Tex Co. is 600 ft. deep; the Groves well cased to 1,000 ft., is making a good showing of both oil and gas; St. Mary well, on Le Compte ranch, is now 900 ft. deep; the New York Syndicate has gas indications in two wells, and work at the Key well will be resumed.

In Liberty County the Texas Co. had a gas blowout while drilling Palmer well No. 2 on Nov. 5. The gas coming in contact with the firebox of a boiler on the nearby Palmer No. 2 well of the Humble Co., was ignited, and a severe explosion resulted. One man was fatally burned, twenty other men barely escaped, and the derricks and rigs at both wells were damaged.

The Houston Oil Co. is testing No. 1 well at 1,980 ft. Other tests in the vicinity are temporarily suspended on account of high water.

In Mills County, Tex., new wells contracted for in the vicinity of Goldthwaithe are: Simms Oil Co., of Houston, two wells on school land northwest of Mullin, to be not less than 3,300 ft. if oil is not discovered sooner; L. H. Armstrong, of Huntsville, Ala., 4,000-ft. well on Armstrong survey west of Mullin, the work to begin by Dec. 15; the Mill Oil Co. well on the Cryer tract. In Wichita County, Tex., Waggoner City was destroyed by fire on the morning of Nov. 9. This place was also known as "New Town," and is in the heart of the northwest extension of the Burkburnett field. The fire originated by nightning striking a battery of steel storage tanks, and a river of fire flowed through the town, igniting everything with which it came in contact. It is stated that fifty steel tanks and 200 derricks were destroyed, and it is estimated that 1,000 people are homeless. The total damage will amount well over $1,000,000. One life is known to have been lost.

The Western Oil Corporation, of Wichita Falls, has given the oil and gas division of the Railroad Commission notice of its acceptance of the act of 1919 regulating pipe lines, and agrees to become a common carrier. The company operates a pipe line between the northwest extension of the Burkburnett field and Burkburnett station.

During October, 157 wells were completed in the Burkburnett field. This is a considerable reduction in number compared to September and August. The wells are now making a smaller average production than those first drilled.

NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

Tariff Legislation

A subcommittee of the Senate Committee on Finance, composed of Senators Watson, of Indiana; Thomas, of Colorado; and McCumber, of North Dakota, has listened to testimony regarding the need for tariff legislation on tungsten from Representative Timberlake, of Colorado; Roy C. McKena, of Latrobe, Pa.; and Frank N. Franklin, of Denver. The hearing was held largely to accommodate the witnesses, who wished to submit testimony before returning to their homes. It continues to be the view of the majority of the Senate Finance Committee that tariff legislation should be general and not piecemeal. That view has prevented the advancement of the various tariff measures which were passed earlier in the extra session by the House.

Atmospheric Nitrogen

The formation of the United States Fixed-Nitrogen Corporation, to produce and develop the products of atmospheric nitrogen, is proposed in a bill, drafted in the War Department, and introduced in their respective houses by the chairmen of the committees on Military Affairs. The organization of the corporation is to be undertaken, the bill provides, by a committee of five persons appointed by the Secretary of War. Once formed, the corporation is to be conducted under the supervision and control of the board of directors, which is to consist of not less than three nor more than eleven members, and is to work along lines usually followed by directors of private corporations. The members are to be appointed by the Secretary of War and are to hold office at his pleasure.

The corporation is to take over nitrate-fixation plants No. 1 and 2, situated, respectively, at Sheffield and Muscle Shoals, Ala., and in addition, the fixed-nitrogen research laboratory at Washington, the Waco limestone quarry, the electric-power unit at the Warrior River Station of the Alabama Power Co., and any other plants or equipment owned by the Government which will be helpful to the general project.

The corporation is charged with the completion and operation of the hydro-electric power plant now being constructed at Muscle Shoals. It is also to acquire United States or foreign patents and processes. It is to be allowed to export its products only when there is a surplus in addition to that purchased by the Government or by private interests within the United States.

There is to be common and preferred stock. The common stock is to be without par value, and is to be delivered by the corporation to the Government. The corporation also is empowered to issue preferred stock when necessary and sell it in any amount not to exceed $12,500,000. The bill has been referred to the committees on Agriculture.

Suspension of Assessment Work

With only two votes against it, Representative Garland's resolution providing for the suspension of assessment work on all mining claims for the year 1919 was passed by the House. It was then promptly considered and passed in the Senate. On becoming a law it will supersede the House resolution, which limited the suspension to those holding five claims or fewer. The language providing that those holding more than five claims must do assessment work is ambiguous and likely to lead to litigation. That fact, together with the prevailing high prices, the difficulty of procuring labor, and the lateness of the season, is the principal reason given for changing the existing statute. The bill as reported includes Alaska within its provision.

The Secretary of the Interior in his recommendation to the committee urged that the new resolution be given favorable consideration, as he believes that the five-claim proviso in the existing law is likely to be productive of controversy and confusion, in view of the fact that fractional interests in mining claims are held by many citizens. He thinks it will be almost impossible to interpret and apply the limitations.

Mine Inspectors Wanted by the Government

The U. S. Civil Service Commission announces an open competitive examination for mine inspector to fill a vacancy in the Indian Service, Seneca Agency, Okla., at $2,000 a year, and vacancies in positions requiring similar qualifications, at entrance salaries ranging from $2,000 to 3,500 a year. Competitors will not be required to report for examination at any place, but will be rated on the following subjects: Education and preliminary experience, 30; responsible experience and fitness, 70.

The duties of the position consist of the inspection of mines, mills, smelting works, oil, ore, and quarry operations, with respect to their safe and proper development. Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C. Applications must be filed prior to the hour of closing business on Dec. 30, 1919.

Physicists Needed by the Government

The U. S. Civil Service Commission announces an open competitive examination for associate physicist qualified in physical metallurgy, for men only, at salaries ranging from $2,000 to 2,800 a year; and

assistant physicist qualified in physical metallurgy, for both men and women, at salaries ranging from $1,400 to $1,800 a year, to fill vacancies in the Bureau of Standards, Department of Commerce, for duty in Washington, D. C., or elsewhere, and in positions requiring similar qualifications in other branches of the service.

Competitors will not be required to report for examination at any place, but will be rated on the following subjects, which have the relative weights indicated: Education in general physics, chemistry, and mathematics, 40; special education and experience in physical metallurgy, 60. On account of the needs of the service, applications will be received until further notice. Applicants should at once apply for form 1312, stating title of examination desired, to the U. S. Civil Service Commission, Washington, D. C.

Select Committee on Expenditures in the War Department

Representative Graham, of Illinois, as the chairman of the Select Committee on Expenditures in the War Department, expects to sum up his conclusions of the extended hearings conducted by his committee in an address before the House in the near future. In asking the House to vote favorably on the resolution requesting the Secretary of War to make a review of certain settlements for war materials, Mr. Graham makes the following reference to the purchase of surplus copper by the United Metals Selling Co.: "Immense profits were made by the producers of copper by virtue of a combination of the low-price copper producers, which combination was aided and encouraged by the Government, although in violation of the law of the land."

Mr. Graham's committee recommends "that if it be found that sums of money are due the Government on account of such settlements being fraudulent, or not according to the tenor of the law, proceedings be instituted by the Secretary of War to recover the sums of money due the Government."

General Leasing Bill

Failure of the conferees on the mineral leasing bill to reach an agreement during the extra session of Congress is not indicative of any unusual delay of this measure in conference. The conferees met only for two short sessions. It was evident that the matter could not be disposed of during the short time before adjournment, and it was agreed not to take up the bill in detail until the beginning of the regular session.

The President, on Nov. 13, signed the bill suspending all assessment work on mining claims for the year 1919. The measure is now a law, and those holding five or more claims are released from the assessment work requirements as the holders of a smaller number of claims have been released by an earlier act. To obtain the benefit of this suspension, claimants must file a notice of their desire in the office where the location or certificate is recorded on or before Dec. 31, 1919.

Testing of Mine and Track Scales

Work by the Bureau of Standards in connection with mine and track scales has been continued in different sections of the country, and six men are now employed in this field. The mine scale trucks have operated in the states of Tennessee, West Virginia, and Kentucky, and track-scale testing equipments have covered the states of Kentucky, Michigan, Minnesota, North Dakota, Montana, and Washington.

A member of the Bureau's staff recently attended a meeting with representatives of the American Railroad Association and the scale department of the Pensylvania R. R., in order to discuss the subject of track specifications. As a result of this conference, it has been proposed to add to the committee of the American Railroad Association a representative of the Bureau of Standards. It is hoped that when this committee is organized, it will form a means whereby progress in the securing of accurate weights on railroads will be expedited and all railroads will be induced to adopt types of scales and weighing rules which will result in first-class weights.

President Calls New Industrial Congress

According to an announcement on Nov. 20, the President has issued invitations to a new conference of former Federal and state officials, business men, and economists, to meet in Washington, on Dec. 1. Guided by the experience of the last conference, the President has thought it advisable that in the new body there should be no recognition of distinctive groups, but, instead, action in the interest of the people as a whole.

The personnel of the new conference, which does not include any of the men who served in the previous conference, is as follows: W. B. Wilson, Secretary of Labor; Thomas W. Gregory and George W. Wickersham, former United States Attorney-Generals; Herbert Hoover; Oscar Straus, former Secretary of Commerce; Henry M. Robinson, of Pasadena, Cal.; Frank W. Taussig, former chairman of the Tariff Commission; Samuel W. McCall, Martin H. Glynn, and Henry C. Stuart, former governors of Massachusetts, New York, and Virginia, respectively; W. O. Thompson, of Ohio State University; Richard Hooker, of Springfield, Mass.; George T. Slade, of St. Paul; Julius Rosenwald, of Chicago; Owen D. Young, of New York City; H. J. Waters, of Manhattan, Kan., and Stanley King, of Boston.

Prospecting for Potash

Despite the rather gloomy future of the domestic potash industry, a considerable number of prospecting permits are being issued, the total of such permits now exceeding 200. Most of the permits issued cover areas in southern California, Nevada, and Utah, but some are being issued in New Mexico, Colorado, and Arizona. As two years are allowed for prospecting, no one has yet applied for a patent.

All of the lake bed proper at Searles Lake, Cal., is covered by leases. Ten leases have been issued covering that area, only three of which are being

operated. Information reaching the General Land Office, which is in charge of potash leasing, is to the effect that active work is in progress on the plant being erected on the leucite deposit in Sweetwater County, Wyo. A number of operations are in progress on the Salt Lake desert. Applications have been made for patent on several claims in that region which were taken up prior to the potash-leasing law.

Several holders of leases have been granted an extension of one year in which to begin operations, but the Secretary of the Interior has announced that no extension beyond one year will be granted.

Exports of Mining Machinery

The exports of mining machinery from the United States during September, 1919, according to the Bureau of Foreign and Domestic Commerce, were as follows:

Countries	Oil Well	All Other
Belgium	.....	$ 7,564
France	.....	152,766
Netherlands	.....	1,766
Rumania	$ 31,622	4,520
Sweden	.....	6,100
England	.....	142,621
Canada	7,045	54,463
Costa Rica	.....	326
Guatemala	1,054	.....
Honduras	.....	1,676
Nicaragua	.....	8,501
Panama	.....	1,514
Mexico	41,780	145,769
Barbados	771	.....
Trinidad and Tobago	34	.....
Cuba	3	2,508
Dominican Republic	547	515
Argentina	11,441	.....
Bolivia	.....	1,925
Brazil	10,058	.....
Chile	.....	48,319
Colombia	.....	8,197
Ecuador	3,740	.....
Dutch Guiana	.....	4,517
Peru	923	30,590
Uruguay	.....	169
Venezuela	1,765	.....
British India	12,071	.....
Dutch East Indies	377	924
Japan	1,940	44,020
Russia in Asia	.....	848
Australia	.....	2,657
New Zealand	.....	3,512
Philippine Islands	24,951	50
Belgian Congo	.....	145
British West Africa	1,057	250
British South Africa	.....	46,676
Portuguese Africa	.....	198
Egypt	121	.....
Totals	$151,300	$723,606

High Prices for Silver

For the first time in nearly fifty years silver went under the 16 to 1 ratio to gold on Nov. 10, when bullion sold in the New York market at $1.305 per oz., according to the Guaranty Trust Co., of New York. This was the highest price since 1872, when silver brought $1.325 per oz. Though this price for bullion would yield a profit to those melting down silver dollars, the silver in which is worth $1 when the price of bullion silver is at $1.2929, it is doubtful whether such melting will take place to any great extent unless the present high prices for bullion are maintained for a considerable period.

The rise in the price of silver is attributed to the heavy demand for the metal by England, Canada, India, Hongkong, and China. Stocks, in China especially, were reduced by the embargo on exports which was maintained from the summer of 1918 until last May. Since the lifting of this embargo China has been taking more silver than all other countries combined. In August, China took $10,911,987 in silver, and since then her agents have been in the market for even larger quantities.

Foreign Trade in Metals and Ores

Imports and exports of the more important metals and ores, are reported by the Department of Commerce, for September, 1919, and the figures for September, 1918, as finally revised, as as follows:

IMPORTS FOR SEPTEMBER
(In pounds unless otherwise stated)

	Sept. 1918	Sept. 1919
Antimony ore, contents	Nil	28
Antimony matte, regulus or metal	6,201,579	393,070
Copper:		
Ore, contents	4,253,028	3,712,966
Concentrates, contents	4,936,050	2,789,346
Matte, regulus, etc., contents	1,639,732	6,445,780
Imported from (in part):		
Canada	2,168,703	2,194,122
Mexico	4,892,799	9,396,950
Cuba	2,736,644	87,392
Chile	768,970	891,200
Peru	35,744	55,868
Unrefined black, blister, etc.	37,570,650	22,686,470
Refined in ingots, plates, etc.	1,472,451	869,157
Old, etc., for remanufacture	103,516	199,324
Composition metal, copper chief value	16,548	1,896
Lead:		
Ore contents	5,202,110	1,414,137
Bullion, contents	17,905,345	21,476,853
Imported from (in part):		
Canada	5,475,572	1,531,828
Mexico	17,622,554	21,359,162
Pigs, bars and old	13,163	2,622,636
Pyrites, long tons	50,651	28,658
Imported from (in part):		
Spain, long tons	4,349	20,583
Canada, long tons	43,623	8,061
Tin ore, long tons	683	4,036
Tin bars, blocks, pigs, etc.	10,928,098	11,087,403
Imported from (in part):		
United Kingdom	627,262	5,412,168
Straits Settlements	5,482,436	4,730,489
Dutch East Indies	2,949,120	743,524
Hongkong	1,016,299	10,822
Zinc:		
Ore, contents	4,030,201	1,910,486
Imported from (in part):		
Canada	538,800	424,258
Mexico	3,431,401	1,486,228
Blocks, or pigs, and old	7,762	34,477
Manganese ore, long tons	72,685	19,601
Imported from (in part):		
Cuba	12,664	275
British India	2,775	500
Brazil	50,414	16,786
Tungsten ore, long tons	1,134	818

EXPORTS OF COPPER, LEAD AND ZINC
(In pounds)

	Sept. 1918	Sept. 1919
Copper:		
Ore, contents	132,242	3,000
Concentrates, contents	42,716	52,460
Unrefined, black, blister, etc.	Nil	Nil
Refined, in ingots, bars, etc.	73,302,985	62,341,191
Exported to (in part):		
France	8,938,231	8,317,911
Italy	15,564,737	13,051,699
United Kingdom	45,975,753	2,814,973
Canada	2,668,470	2,581,539
Composition metal, copper chief value	3,548	10,928
Old and scrap	Nil	201
Pipes and tubes	327,325	641,448
Plates and sheets	1,166,832	307,742
Wire, except insulated	665,332	2,523,049
Lead:		
Pigs, bars, etc., produced from domestic ore	8,062,118	1,976,815
Produced from foreign ore	9,389,476	7,416,828
Exported to (in part):		
United Kingdom	11,061,754	224,000
Canada	3,010,633	149,701
Brazil	358,400	112,000
Japan	2,351,316	7,375,295
Zinc:		
Dross	2,366,669	110,613
Zinc produced from domestic ore	10,511,200	19,034,689
Zinc produced from foreign ore	3,794,068	1,486,337
Exported to (in part):		
France	3,287,303	160,137
Italy	1,908,298	None
United Kingdom	5,661,518	5,320,504
Canada	338,167	68,149
Mexico	502	400
Japan	3,009,924	14,794,410
In sheets, strips, etc.	1,895,699	3,432,428

The New Oil Field at Colony, Creek County, Wyo., was first entered by the Roxana Oil Co. and several of the larger oil companies have since secured leases. The field is twenty-five miles west of Belle Fourche, in Butte County, where a standard oil rig had arrived recently on its way to the new oil field. Drilling was expected to begin about the first part of November.

By The Way

Tungsten and Tombstone

Two years ago it was reported that tombstones were being used for location monuments in the district near Sodaville, Nev., where a "rich ledge of tungsten ore" was discovered. One miner located the village cemetery, and, as there were no rocks near, he used some of the best looking tombstones to mark the boundaries of his claim. Others followed suit, and soon it was difficult to recognize one claim from another. There are those today who will say that there is something fittingly symbolical about a tombstone as far as tungsten is concerned.

Leadville Reformed

Leadville in boom days was the gambler's paradise. But there the day of the gilded den has passed. By a court order this fall much elaborate paraphernalia seized in several establishments was destroyed. Roulette wheels and other devices were the food for a spectacular bonfire. One roulette wheel, valued at $2,500, is said to have been one of the finest "wheels" in the West. It was a "crooked" wheel, with a "squeeze" that could be controlled by the operative or from another room than that in which the "play" was being conducted. More fortunes were won and lost in Leadville than in any other Colorado camp.

The Curfew Law in Chemistry

The American Chemical Society in announcing its regular meeting for December makes the statement that the usual informal dinner will be held before the meeting at the clubhouse in New York. It then goes on to say that "house rules of the Chemists' Club make no provision for the entertainment of ladies in the club proper after 4 p. m. We are forced, therefore, to exclude our lady members from this dinner invitation."—Why, we ask, on behalf of our friends among the fair sex, is the line drawn at 4 p. m.? Has not even a chemist noticed that the lady fair is even fairer after this time than before? But perhaps the lonely worker of the laboratory is more susceptible to the lure of the ladies than most people by reason of the very seclusion in which he generally hides himself. Self-defense is one of the first laws of nature, and here, perhaps, may be found an explanation of the odd rule in effect at the Chemists' Club.

Whither Are We Drifting?

An editorial writer in September "Industrial Management" seizes upon "The Parable of the Laborers," Matthew XX, and applies his interpretation to present-day problems with a right good will and, also, with most lofty spirit. The parable tells us that, when pay day came, each laborer received a penny—even those engaged at the eleventh hour; the said hour of the calling of "Time" indicating that the basic eight-hour-day had not, in St. Matthew's era, been made an article of faith. Our contemporary argues that the parable must be interpreted as sanctioning and confirming the justice of the demand for a living wage, irrespective of the hours worked! This is good news indeed—for some! Does the one-hour day—Saturday half-holiday—impend? We are further told by the journal quoted: "The bond of so-called natural, economic, and judicial laws is crumbling, and, whether we will or not, labor will come into its own." We should say so! If the interpretation be prophetic, labor will soon come into everybody's own. We imagine organized labor will be compelled blushingly to admit, "This is 2 mutch."

Another Children's Crusade

Under the heading "School Children Demand the Metric System," the World Trade Club of San Francisco has issued another bulletin advocating the use of the metric system. The appeal contained is worded as follows:

> The World Trade Club is daily receiving evidence as to the growing strength of public opinion thruout Britannia in favor of metric standardization. Just the other day word came from one of their co-workers in England of an interesting episode that took place during one of his lecture tours.
>
> At Kingsbridge he spoke before a gathering of enthusiastic schoolboys from the local grammar school, telling them of what adoption of the metric units of measurement would mean to the school children of the world,—how easy metrics are to learn, how simple to apply—in short, that it would lessen the necessary time spent on arithmetic by three years.
>
> At the close of his talk, the boys unanimously adopted a resolution urging other schoolboys to go on strike with them against the British weights and measures, and demanding that only metrics be taught in the schools. These English youngsters realized the increase in efficiency, and the immense saving of time and labor obtainable through the meter-liter-gram.

In a previous bulletin the club chronicled the fact that Henry Ford had taken up arms in behalf of the metric system. That may be accepted in all seriousness. Mr. Ford has enough money to do many things, and is doing them sometimes. However, when the World Trade Club holds up the action of children as a pattern for adults to follow, for this is what the bulletin referred to really means, it must expect to have its utterances taken as a joke. This criticism is not to be considered as for or against the metric system—much is to be said for both sides of the controversy. If this were not so, there would not be any controversy. But unless the World Trade Club can do better than this, it had better fire its press agent or else be listed among the amusements of the day.

Exit the Ball Mill

The following interesting communication from E. W. Lawler has been crowded out of our "Correspondence and Discussion" section, but we are publishing it here in order to get it before our readers at the earliest moment. We have been hoping for a solution of the ball-mill controversy for some time, but had not before thought it would be settled by

the total elimination of such mills from the flow sheet, as will follow the general introduction of the following process, the devilish ingenuity of which is at once apparent.

Manufacturers of pottery and china, it is said, require that large chunks of enamel be broken up into small pieces without the admixture of iron, which would interfere with the color. In order to do this, the enamel, in molten condition, is poured into water, a process known as "water-cracking," and somewhat similar to the method of granulating slag.

The idea has now, it seems, been applied to ore reduction and successfully used at one of the largest gold mines on the Hawaiian Islands. Melting the ore was found to be expensive, so the ore is merely heated to redness and the requisite temperature drop obtained by plunging the hot ore into cracked ice instead of water. The flow sheet is something as follows: The ore, crushed to about 1 or 2-in. size by any economical or other means, is delivered on a conveying belt made of "ass-best-toes." (These belts are made from the front toes of the best burros in the pack train. Whenever a burro dies, his feet are saved; in this way, cheap material for repairs is always available.) An ass-best-toes belt is necessary on account of the extreme heat through which the belt must pass. The ore is conveyed between two electrodes and the current passing through it heats the rock to the proper temperature. The latter, of course, depends upon the fineness of reduction desired.

Immediately after passing through the electrodes, the ore is mixed with cracked ice, which is furnished by a refrigerating machine of a new type, based on the principle of hail. This refrigerating machine, instead of making ice in blocks which would necessitate the use of ice crackers and the consumption of power, simply pumps the brine through pipes, and the rain (this process is only adapted to rainy countries) coming through the chilled pipes turns into hail, or ice. This makes a cheap method of obtaining cracked ice.

The addition of the ice to the red-hot ore causes the latter to crack up to any fineness necessary. This has only been tried on free-milling gold ore, and as the reports indicate that the metal is not at all broken up, the separation of the ore from the metal is easy.

The finely decrepitated rock is sucked away by means of a current of air caused by the sudden cooling of the atmosphere in the vicinity of the refrigerator pipes. This air is so guided by means of proper deflecting vanes as to cause the gangue to be deposited in one place, while the metal, or gold, being heavier, remains on the traveling belt and is carried to a bullion safe at the end, equipped with a trap door.

In dry countries, where rain is not available, it is proposed to deflect some of the air so that it will carry the steam arising from mixing the cracked ice with the hot ore, over the refrigerating pipes to again be turned into cracked ice. Such a regenerative process would, of course, save water.

NEW PUBLICATIONS

Documentos Relacionados con la Legislacion Petrolera Mexicana. Paper, 8 x 10; pp. 700. Secretaria de Industria, Comercio y Trabajo, Mexico City, Mexico, 1919.

A List of Books on Foreign Countries. Compiled by Miss M. L. Prevost for the U. S. Shipping Board. Paper, 6 x 9; pp. 25. Government Printing Office, Washington, D. C., 1918.

Iron-Depositing Bacteria and Their Geologic Relations. By Edmund Cecil Harder. Paper, 9 x 11; pp. 89, illus. Professional Paper 113, U. S. Geological Survey, Washington, D. C., 1919.

Techno-Chemical Receipt Book. By William T. Brannt and William H. Wahl. New Enlarged Edition. Cloth, 5 x 7½; pp. 516, illus. Henry Carey Baird & Co., Inc., New York, 1919.

Clays and Shales of Minnesota. By Frank F. Grout, with contributions by E. K. Soper. Paper, 6 x 9; pp. 259, illus. Bull. 678, U. S. Geological Survey, Washington, D. C., 1919.

Deposits of Manganese Ore in New Mexico. By Edward L. Jones, Jr. Paper, 6 x 9; 24 pp., one map. Bulletin 710-B, U. S. Geological Survey. Contributions to economic geology, 1919, Part 1, pp. 37 to 60.

The history and geologic relations of manganese deposits in the state. The orebodies are small and costs of mining and transportation high so that it is doubtful if profitable extraction can be made, at least at pre-war prices. Descriptions of deposits and operations, including exploration, development, and production, in Dona Ana, Grant, Sierra, and Socorro counties are given.

Manganese Deposits of the West Foot of the Blue Ridge, Virginia. By G. W. Stose, H. D. Miser, F. J. Katz, and D. F. Hewett. Paper, 7 x 10; pp. 166, illus. Bulletin 17, Virginia Geological Survey, Charlottesville, Va.

The report covers in a complete manner the work which has been done jointly by the Virginia Geological Survey and the U. S. Geological Survey in this section, and is an excellent example of the scope that should be included in studies and investigations of other mineral-bearing districts. The information is well arranged, and the bulletin constitutes a most valuable work on the subject of manganese deposits.

Mineral Resources of Georgia and Caucasia, with a Chapter on the Manganese Industry of Georgia. By D. Ghambashidze. Cloth, 5½ x 8½; pp. 182, illus. George Allen & Unwin, Ltd., London; The MacMillan Co., New York, 1919.

Of no little interest to the reader is the introduction to this book in which the author presents a number of pertinent facts regarding the country of which he writes and concerning which many of us know but little. The neglect of Russia to develop the natural resources and her prevention of outside capital from entering this field have served to retard the development of the mineral potentialities of Georgia. Already well recognized as one of the three great manganese producers of the world, the district is rich in other minerals which await development. With some exceptions mining has not been carried on by extensive operations, but this has been due, in great measure, to unsettled conditions. Under the present government and a well directed mining board, the possibilities of financial return from mining in Georgia hold considerable promise to investors of foreign capital.

PERSONALS

Walter M. Stephen is now residing at 15 Central Ave., Staten Island, New York City.

Donald G. Campbell, of Seattle, is in Alaska for the winter, investigating properties north of Nome.

A. J. Wyly has left Lebong, Tandai, and is now at Lebong Donok, Moeara Aman, Sumatra, Dutch East Indies.

S. M. Levy, manager of the Calaveras Copper Co., Copperopolis, Cal., spent a few days in New York recently.

Edel Moldenke has returned to Watchung, N. J., after spending two years in Burma with the Burma Mines, Ltd., as mining engineer.

John Ogden has closed his laboratory in Philadelphia and is associated with the United Reduction & Metal Co., Denver, Col., as chief chemist.

P. G. Beckett has been appointed general manager of Phelps Dodge Corporation, with headquarters at Douglas, Ariz., effective Jan. 1, 1920.

Theodore W. Richards, professor of chemistry at Harvard University, has been elected president of the American Academy of Arts and Sciences.

A. J. Crowley, superintendent of Nevada Sulphur Co., has returned to the mines near Winnemucca, after spending several weeks in San Francisco.

G. M. Colvocoresses, general manager of the Consolidated Arizona Smelting Co., Humboldt, Ariz., is in New York City for two or three weeks.

Scott H. Sherman, manager for a number of years of the Gila Copper Sulphide Co., at Christmas, Ariz., has resigned. He will reside in Phoenix, Ariz.

L. D. Adams has returned to San Francisco after spending several months visiting various properties in eastern Canada in which he is interested.

W. J. Elmendorf, of Campbell, Wells & Elmendorf, Seattle, is now at Sandon, B. C., in operating charge of the Mercury, Charleston and Gault silver-lead mines.

Albert H. Low, senior member of Von Shulz & Low, assayers and chemists, of Denver, was appointed professor of chemistry at the Colorado School of Mines on Oct. 1.

William Crosley, who went to Burma in May, 1917, to engage in the production of tungsten, is making preparations to return, and expects to be in London in December.

A. T. Thomson, assistant to the President, Phelps Dodge Corporation, who has had his headquarters in Douglas, Ariz., will return to the New York office on Jan. 1, 1920.

F. A. Goodale, of Colfax, Cal., has gone to Australia to make an extensive examination of a placer property containing gold and sapphires. He will be gone about four months.

Fletcher Hamilton, W. J. Loring and **L. D. Gordon,** of California, attended the St. Louis meeting of the American Mining Congress to advocate a protective tariff on quicksilver.

N. O. Lawton, formerly mine superintendent of the Miami Copper Co., has been carrying on some successful diamond drilling at Pilley's Island, Newfoundland, for the Blast Furnace Products Co., of New York.

George R. Fawcett, mining engineer of the Arizona State Bureau of Mines, is lecturing throughout Arizona on "Practical Mineralogy for the Prospector," to aid in the discovery and development of valuable mineral deposits.

H. W. Kitson, formerly on the staff of the Engineering and Mining Journal, has gone to Tampico, Mex., to examine oil lands, and will be absent about a month. Mr. Kitson recently established headquarters at 1209 Mills Bldg., El Paso, Tex.

Lindsay Duncan, formerly chief mechanical engineer of the Nevada Consolidated Copper Co., and **Curtis Lindley, Jr.,** mining and construction engineer, have formed a partnership under the name of Duncan & Lindley. Their address is Room 649, Mills Bldg., San Francisco.

W. G. Miller, provincial geologist of Ontario, has returned to Toronto from a six months' stay in Europe, where he was engaged in completing the organization work of the Imperial Mineral Resource Bureau. While abroad Doctor Miller visited the battlefields of France and Belgium.

J. Parke Channing was the guest at a recent banquet in Miami, Ariz., of the Globe-Miami Chapter of the American Association of Engineers. In his address Mr. Channing dwelt upon the conservation of water and the work of the National Engineering Council, of which he is a member.

T. H. O'Brien has been appointed manager of the Industrial and Public Relations Department of Phelps Dodge Corporation, and consulting engineer of the Stag Canyon Branch, with headquarters at Douglas, Ariz. Mr. O'Brien has been manager of the Stag Canyon Branch, but resigned that position and will be succeeded by **W. D. Brennan.**

Charles Eugene Schneider, the French steelmaster, and head of the Creusot Iron Works, who has been touring this country, has received the honorary degree of Doctor of Science from Western Reserve University, the honorary degree of Doctor of Engineering from Stevens Institute of Technology, and the honorary degree of Doctor of Science from the University of Pittsburgh. In Pittsburgh M. Schneider was extended the freedom of the city and was presented with its flag. On Nov. 23 M. Schneider addressed a mass meeting of Alsatians, Lorrainers and Czecho-Slovaks in New York and was presented with a gold medal, on which was inscribed "Noble Son of Lorraine," from the Association of Alsatians and Lorrainers.

OBITUARY

Henry Laurence Gantt, an industrial engineer of national reputation, died on Nov. 23 at his home in Montclair, N. J. Mr. Gantt studied at Johns Hopkins University and Stevens Institute of Technology. In association with the late Frederick W. Taylor, he helped to install modern methods of manufacture at the plant of the Midvale Steel Co. and at other large industrial establishments. Mr. Gantt was the author of "Work, Wages and Profits," "Industrial Leadership" and "Organizing War Work," as well as a number of articles in technical journals.

SOCIETIES

Institution of Petroleum Technologists held its first meeting of the session on Oct. 31, with the president, Sir Frederick W. Black, in the chair. A paper on "Some Laboratory Tests on Mineral Oils" was read by Arnold Philip.

American Institute of Chemical Engineers will hold its twelfth annual meeting at the Hotel De Sota, Savannah, Ga., Dec. 3-6, 1919. The meeting will be devoted largely to Southern chemical industries, and a number of inspection trips have been arranged. Among the papers to be presented is one by J. G. Bailey on "Acid Electric Furnace Ferrotungsten."

American Welding Society—Realizing the necessity of publishing its proceedings regularly, the "Journal of the American Welding Society" has been started by the American Welding Society, and its first issue, dated October, 1919, has been published. The size adopted is 8½x11 in., and printing and illustrations are excellent. The first issue contains 64 pages, including the

cover, of which 36 are advertising. The address of the American Welding Society is 33 W. 39 St., New York City.

American Electrochemical Society—Arrangements are being made for the spring meeting to be held in Boston, Apr. 8, 9, and 10, 1920. On Apr. 9, there will be joint meeting with the American Institute of Electrical Engineers, and it is proposed to have two symposiums on that date, on "Electrically Produced Alloys" and on "Power for Electrochemical Purposes." On Apr. 8, there will be a symposium on "Colloids."

The New York Section recently elected the following new officers: W. S. Landis, chairman; W. A. Cowan, vice-chairman; H. B. Coho, secretary-treasurer.

American Association of Engineers announces that effective with the January number its official publication, "The Monad," will be published under the name of "Professional Engineer." At the same time the size of the publication will be increased to 9x12 in. The magazine will remain a monthly.

The American Association of Engineers has recently organized chapters or clubs in the following cities: Globe-Miami, Arizona; Terre Haute, Indiana; Phoenix, Arizona; San Antonio, Texas; Tulsa, Oklahoma; Joliet, Illinois; Butte, Montana; Davenport, Iowa; Rock Island, Illinois; Moline, Illinois; Morgantown, West Virginia; Pocatello, Idaho; El Reno, Oklahoma; Arkansas City, Arkansas; Akron, Ohio; Springfield, Illinois; New Orleans, Louisiana; Newell, South Dakota; also at University of Minnesota, University of Arizona, University of Michigan.

INDUSTRIAL NEWS

James A. Lannon, formerly general superintendent of the Atlas Mining & Milling Co., Ouray, Col., has associated himself with the Denver Engineering Works Co., the Aldrich Pump Co., and the Victor M. Braschi Machinery Co., of Mexico City, as their representative, and will have headquarters in Mexico City with the Braschi Machinery Co.

Wisconsin Bridge & Iron Co., North Milwaukee, Wis., announce that E. P. Rankin, Jr., will represent them in the Southwest, with headquarters at El Paso, Tex. Mr. Rankin's address will be P. O. Box 692, El Paso.

Russell W. Stovel, who recently returned from France, where, as Lieutenant-Colonel of Engineers, he served as Chief of the Terminal Facilities Division of the Army Transport Service, has been appointed a consulting engineer of Westinghouse, Church, Kerr & Co., Inc., and, as a member of that organization, will devote his entire time to the company's electrical and mechanical work.

Goodyear Tire & Rubber Co., of Akron, Ohio, has created the position of sales manager, and appointed L. C. Rockhill to that position.

Lincoln Electric Co., of Cleveland, Ohio, announces that Paul M. Lincoln, for many years commercial engineer of The Westinghouse Co., has resigned from that organization, effective Nov. 1, to enter the consulting engineering field, and in that capacity will have active charge of motor application engineering for the Lincoln Electric Co.

Black & Decker Manufacturing Co. has opened an additional office on the Pacific Coast, at 201 Maynard Bldg., Seattle, Wash., in charge of A. E. Nordwall, who will have charge of the distribution of Black & Decker products in the state of Washington, working under the direction of the main Pacific Coast office, 918 Hearst Bldg., San Francisco, Cal.

TRADE CATALOGS

Centrifugal Pumps. The Goulds Manufacturing Co., Seneca Falls, N. Y. Bulletin No. 122, entitled "Centrifugal Pump Sales Service Data"; 8x10; 36 pp.; illus. Contains data on the theory, design, testing, and similar information on centrifugal pumps, including curves and formulæ.

Heat Insulations. The Franklin Manufacturing Co., Franklin, Pa. Catalog F. C. 7-19; 8¼x11¼; 77 pp., illustrated. Describes the insulating products of the company (magnesia and asbestos) and gives the usual sales data and suggestions for the proper type of insulation for certain purposes.

Centrifugal Pumps and Pumping Units. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin; 8x10½; 52 pp.; illus. Describes various types of centrifugal pumps and their particular uses with different kinds of drives. Data in tabular form giving relations between H.P., R.P.M. efficiencies, and capacities, as well as efficiency curves, are included.

Steam, Water and Air Specialties. The McAlear Manufacturing Co., Chicago. Catalog No. 25, describing modern steam, water, and air specialties for high- and low-pressure heating and power plants, and devices for plumbing installations. Catalog entitled "25 Years of Know How," covering vacuum, vapor, and air-line heating specialties, is ready for distribution.

NEW PATENTS

U. S. patent specifications may be obtained from the Patent Office, Washington, D. C., at 5c. each.

Iron and Steel—Metallurgical Process. Joel Lund. (1,320,483; Nov. 4, 1919.)

Iron-Ore Treatment—Process of Extracting Iron From Its Ore. Charles Colcock Jones. (1,319,589; Oct. 21, 1919.)

Iron Oxides—Method of Separating the Oxides of Iron and Other Metals Occurring in Compound Ores. James Claude Adell. (1,318,431; Oct. 14, 1919.)

Lamp—Miner's Hand-Lamp. John Lawrence Conway. (1,319,758; Oct. 28, 1919.)

Manganese—Process of Preparing Highly-Oxidized Manganese Compounds. James C. Adell. (1,318,432; Oct. 14, 1919.)

Molybdenum Bronze. Seiko Shigeta. (1,319,537; Oct. 21, 1919.)

Oil Wells—Packer For. Shelton T. Cameron and Edward R. Inman. (1,318,352; Oct. 14, 1919.)

Open-Hearth Furnace. John O. Griggs. (1,320,387; Nov. 4, 1919.)

Ore-Treating Kiln. William Winkelman. (1,319,939; Oct. 28, 1919.)

Potash—Extraction and Recovery of Potassium or Potassium Salts From Potassium-Bearing Materials. Edgar Arthur Ashcroft. (1,320,193; Oct. 28, 1919.)

Potash—Process of Extracting Potassium Salts. Robert S. Edwards. (1,320,211; Oct. 28, 1919.)

Refractory Materials and Method of Making the Same. Bernard Enright. (1,319,056; Oct. 21, 1919.)

Separating or Concentrating Ores—Apparatus For. David Cole. (1,319,208; Oct. 21, 1919.)

Separation—Apparatus for Separating Minerals. Erastus B. Bennett. (1,320,526; Nov. 4, 1919.)

Separation—Machine for Separating Minerals From Ore-Bearing Materials. Richard P. Park. (1,319,790; Oct. 28, 1919.)

Separator—Mineral Separator. Charles W. Eccleston. (1,319,646; Oct. 21, 1919.)

Slags—Process of Treating Slags. Ulysses A. Garred. (1,319,061; Oct. 21, 1919.)

Steel—Apparatus for the Production of Steel Directly From Pig Iron. Alfred Nielsen. (1,318,906; Oct. 14, 1919.)

Tuyeres—Process and Apparatus for Molding Tuyeres and the Like. Benjamin F. Caffey. (1,321,008; Nov. 4, 1919.)

THE MINING NEWS

New York, November 22 and 29, 1919

Iron Formation Cut at Escanaba, Michigan

An iron formation has been cut at a depth of 550 ft. on lands being drilled by E. J. Longyear Co. five miles from Escanaba, Mich. No ore has ever been found in this vicinity, and even at present only an iron formation has been discovered. The work is being done for the Escanaba Iron Range Exploration Co., which was organized by Escanaba people to prospect the lands that are under option. The fact that the formation is present in that vicinity bears out geological reports made some years ago regarding the extension of the Menominee Range formation to Little Bay de Noc, Lake Michigan. The formation lies under 500 to 600 ft. of sandstone and limestone, not far from Lake Michigan. One well known mining man of the district stated that it would be a difficult task to get ore out from under Paleozoic rocks, his contention being that Lake Michigan is too close by and that water would cause much trouble.

PIT ON GOLD PROSPECT, COPPER LAKE, NORTHERN MANITOBA

Development Work at Copper Lake, Manitoba

J. P. Gordon, owner of the new gold discovery at Copper Lake, in northern Manitoba, has gone to the property to begin development work, on which it is understood $50,000 will be spent. This property will be remembered as the one which attracted so much attention a few months ago. The district is reached in winter by going north of The Pas, Manitoba, on the Hudson Bay Ry. to Mile 43 on the railway. From this point to the vicinity of the new gold find it is about forty-five miles northwest, the trail going over numerous lakes, with portages between. An engineer from the Department of Public Works of Manitoba is in The Pas at the time this is being written, and it is expected that he will proceed to Mile 43 on Nov. 19 and make reconnaissance of the country for a winter sleigh road from the railroad to Copper Lake. Much interest will be taken in the development of this property, because of the spectacular surface showing of free gold in the quartz and vein matter. There are much larger gold-bearing orebodies in close proximity to this high-grade vein, but their gold content has not been determined. The future of this camp will depend on the results of further underground development, although much may yet be learned from surface trenching and sampling.

Radium Found in Ontario

Much interest has been aroused by the discovery of pitchblende in the township of Butt, east of Georgian Bay, Ontario, and as a consequence a number of mining claims have been staked. The pitchblende occurs in a coarse pegmatite dike, which was being mined for mica. The width of the dike has not been exposed, but it has been proved by an open cut for a length of 40 feet. The uranium mineral is found associated with red feldspar and occurs in grains about the size of a pea. So far there is no evidence that the dike contains sufficient pitchblende to permit of its being worked for that mineral. The uranium is distributed sparingly, and from the material already broken one would have difficulty in picking out more than an ounce in an hour. The deposit has been reported on by C. W. Knight, of the Ontario Bureau of Mines.

The Utah Apex Suit

Testimony Taken on Both Sides—Many Prominent Geologists on Both Sides as Witnesses

In the suit now in progress between the Utah Apex and Utah Consolidated mining companies before Judge Tillman A. Johnson in the U. S. District Court in Salt Lake City, the witnesses for the latter company were heard first. Utah Consolidated is seeking to prove that the extralateral rights in dispute center in the Highland Boy limestone as the highest point of mineralization in the two properties and not in the fissuring. Its witnesses gave much testimony in regard to geological conditions and ore deposition. Mine models were brought in as evidence, as well as a large number of maps. Among the witnesses first heard were R. N. Hunt, geologist for the company; Professor J. F. Kemp, Reno H. Sales, geologist for the Anaconda Copper Mining Co.; Professor C. K. Leith, and A. S. Winther, mine superintendent at the Utah Consolidated property.

Prof. Kemp gave a general description of the geology of the camp of Bingham, correlating the Highland Boy limestone with the Jordan limestone, and the Commercial limestone with the Yampa. He said that the limestone beds were the lodes and what the miners prospected in search of ore. In the Utah Consolidated on the 1,300 level a 2,000-ft. drift had been driven under the claims of the Utah Apex, in which a large orebody was opened up. The apex of this body, R. N. Hunt stated, is in the Utah Consolidated grounds. Reno H. Sales, following Professor Kemp, described the mineralizing solutions in coming in as traveling principally along the limestone beds and principally along the Highland Boy lode, declaring that the fissuring had little effect on the mineralization. Professor Leith's testimony followed similar lines.

The Utah Consolidated company finished presenting its side early in the morning session of the court on Nov. 14. Judge John A. Marshall followed,

opening the case for the Utah Apex with an outline of the argument to be followed, and making an introductory statement that all of the orebodies in dispute were in the Utah Apex property, and that they belonged to the Utah Apex company unless it could be proved beyond question that they were on veins that apexed in other properties. He stated that the Utah Apex company was in reality the plaintiff, and that it would be shown that the Utah Consolidated had gone into Utah Apex ground and extracted a large tonnage of ore, an accounting for which the Utah Apex would ask. Bodies opened through the 1,300 level drift, mentioned frequently in the testimony, are claimed by the Utah Consolidated as apexing in its ground in the Highland Boy limestone, which this company holds to be the lode.

Judge Marshall stated that it would be shown that there was a difference of opinion as to what the Highland Boy vein constituted, and that the 1,300 level drift was not run to develop the Highland Boy limestone, but for the purpose of developing the Leadville orebody, and that it was in reality a straight level run through the barren limestone of the Highland Boy, as the result of an examination of Utah Apex underground workings which Utah Consolidated officials were permitted to make a few years ago. He also stated that the lead ore would be shown to be closely associated with the 1,312 level fault.

Witnesses for the Utah Apex company already examined (Nov. 19) have been Frank Anderson, of Salt Lake City, and Ellsworth Daggett, who was manager of the Winnemucca mine at Bingham, Utah, in 1878, also of Salt Lake. Albert Burch, consulting engineer, who has operated extensively in Utah and in the Coeur d'Alene district, and elsewhere, was completing his testimony at the time of writing. The testimony in general was directed with the object of proving that the ore was directly connected with the fissuring and made as much in the quartzite as in the limestone.

New Apex Litigation Probable in Coeur d'Alenes

Marsh Mines Consolidated Claims Apex of East Vein of Hecla Mine

A real sensation was created recently by the announcement that the Marsh Mines Consolidated would lay claim to the apex of the east vein of the Hecla mine, at Wallace, Idaho, involving the ownership of lead-silver ore bodies valued at millions of dollars. At the date of writing (Nov. 10), no legal proceedings have been started, but formal notice has been served on the Hecla mining company by the Marsh company that it will claim the apex, as stated above, and therefore, all the ore that may be in the vein thereunder or that may have been removed therefrom. The vein in controversy is about 600 ft. north and east of the original Hecla vein. It is known that a large body of lead-silver ore has been developed in this vein from No. 3 tunnel level to the 900-ft. shaft level; also that a raise has been made on the vein to the surface presumably establishing the apex in the Hecla ground, the distance from the 900 level to the surface being about 2,200 ft.

The apex claimed by the Marsh company is an extension of the old Tiger-Poorman vein and is on the Russell claim, which has a common south sideline with the Consolidated Extension claim, owned by the Hecla company. The Russell claim, as well as the O'Neil and Mono Fraction, is part of the Tiger-Poorman group, owned by the Federal Mining & Smelting Co., and is held by the Marsh company under a ten-year lease, which will expire on July 20, 1926. The leased ground lies between the Hecla and the Marsh ground property.

It appears from the lease on record that the Federal company was preparing to bring suit against the Marsh to recover the value of large quantities of ore alleged to have been removed by the Marsh through underground workings into the Tiger-Poorman ground, and in consideration of the agreements entered into in the lease, the Federal company waived its right of action to recover for the ore alleged to have been extracted. Under the terms of the lease the Marsh company agreed to spend $40,000, at the rate of not less than $2,500 per month, in the development of the Russell, O'Neil, and Mono Fraction claims, the work to be done under the supervision and direction of the Federal company, the lease expressly stating that "It is the intention of this agreement to leave the conduct of the work to the party of the second part (Marsh), but the judgment of the party of the first part (Federal) shall be conclusive as to the place or places where the work shall be done, and the character of the work to be done." The Marsh company agreed to pay the Federal a fixed royalty on ore shipped during the life of the lease. It may be assumed that in planning the work it was the apex of this Hecla vein that was being sought, albeit it is described as the extension of the Tiger-Poorman vein.

It is evident that the Federal company is more deeply interested in the final decision than the Marsh, for as apex litigation goes it would be a physical impossibility for the Marsh, in the event it should win, to make much headway in mining the ore during the life of its lease, and unless there is an agreement outside of the lease that would give the Marsh a right to the ore extracted by the Hecla, and for which it would be required to account, it would seem that the Federal company would be the sole beneficiary. In the absence of anything but the most general information, the prevailing opinion is that the Hecla is secure in its apex rights. The company is capably and carefully managed, and it hardly seems likely that its rights would have been neglected in this respect. But in any event, the outlook is that another long apex battle is being staged in which will be matched the most brilliant mining lawyers, geologists, and mining engineers.

Ecuador Has New Mining Law

The Congress of Ecuador recently passed a law declaring that unless the exploitation of mines in that country was begun within two years from the promulgation of the law, the rights of the holder of the patents would cease until a new law would be enacted, according to a cable dispatch received by the Department of Commerce. The law further provides, according to the report, that unless the patents are paid for within a time specified by the mineral code, the acquired right would, ipso facto, be void. The charge for the annual patent fee is to be not more than 10 per cent of the gross production and not less than £5.

Industrial Dispute Compromised at Tonopah and Divide

The labor troubles which have been bothering the Tonopah and Divide districts for several months are believed to be definitely settled. The newly organized miners' and craftsmen's unions which called off the original strike recently made demands for an increase of $1 a day in wages. After a number of conferences with the operators, a compromise was agreed upon, of which the following are the principal features:

The operators agree to establish a commissary within sixty days and to sell the necessities of life at cost to their employees, plus operating expenses, and the employees are to have equal representation on the advisory board. Coal shall be sold and delivered to all employees at cost. Operators will grant a bonus to all employees of 50c per shift, retroactive to the time the individual employee returned to work, provided such employee is still on the payroll. At the end of sixty days a Federal mediator will be

called in and if he finds the commissary functioning fully, he will so declare and the bonus will be withdrawn. Should he not find it so, he will return each thirty days thereafter until he does find it functioning fully, the bonus in the meantime to be continued. Board shall be given to single men at $37.50 per month where boarding houses are now or hereafter operated by companies. Goods from the store to be sold to private boarding house keepers who furnish board to employees at $37.50 per month.

The agreement, which was signed by both parties, is effective to Aug. 15, 1920.

Ontario's New Minister of Mines

The new Ontario government, which is a combination of farmer and labor members, has appointed a Minister of Mines in the person of Harry Mills, of Fort William. Heretofore lands, forests, and mines have been under one department, but will now be under two departments, with the mines having a minister of their own. Mr. Mills is a labor representative and has been a locomotive engineer on the Canadian Pacific Ry., and, having once worked in a coal mine in Wales in his early youth, probably possesses the qualifications necessary for a successful minister for the Department of Mines. The industry is said to view the appointment with interest and some trepidation. In interviews credited to Mr. Mills it was intimated that his department would be expected to provide the revenue for the new scheme of mothers' pensions which the labor members propose to have enacted. The new members of the cabinet, however, impress one as being sincere and honest, and there is no doubt that Mr. Mills will familiarize himself with conditions before attempting to impose higher taxes.

Mesabi Ores Shipped to St. Louis by Water From St. Paul

A new outlet for Minnesota ores was opened on Oct. 21 when two large steel barges were loaded at St. Paul for shipment to the Mississippi Valley Iron Works at St. Louis. The barges are 300 ft. long and 48 ft. wide and are the forerunners of others if the traffic proves successful. Capacity is 1,500 tons, and with the current of the river a small tug can handle a large fleet of them. It is planned to institute a return traffic in coal. The original shipment was loaded by the simple but slow expedient of spotting the cars on a river bridge and tripping the hoppers into the barges below one at a time. An entire day was required for the loading of less than 3,000 tons, and better dock facilities will have to follow. The ore came from the Mahoning mine at Hibbing.

PROGRESS OF MINING OPERATIONS

Important Events of Interest Condensed and Classified for Easy Reference

ALABAMA.

BIRMINGHAM DISTRICT

The coal situation in the Birmingham district is becoming acute. The miners are not returning to work as promptly as was hoped, and the non-union mines, though turning out record productions, are not able to supply the whole demand. A number of plants are said to be on the point of closing, owing to coal shortage, and those fortunate enough to have a large reserve stock are diminishing the same rapidly. This is particularly noticed at some of the ore mines. All the ore-mine and furnace operators are also interested in coal production, and the two interests are so combined that what affects one seriously affects the other.

One of the new batteries of the by-product coke plant of the Tennessee Coal, Iron & Ry. Co. at Fairfield, Ala., has been completed. The battery will be put in operation about the first of next year. A large crane is to be erected to make possible the storing of large quantities of coke.

ARIZONA.

BISBEE DISTRICT—SILVER BELL—MIAMI

Bisbee—The Copper Queen expects to use its new steel power line about Dec. 1. A substation has been established near the Warren concentrator site, from which lower voltage lines will run to the mill and the Calumet & Cochise shaft, where pumps will be electrically operated. The builders hope to have the new 4,000-ton flotation and concentrating mill ready for operation by July 1, 1920—another Phelps Dodge property, operated by the Night Hawk Leasing Co., is working a large body of 10 per cent copper ore. James McKenna is the company's representative. —At Dos Cabezas the Basin mine has been shipping gold concentrates from its twenty-stamp mill. The property is operated by Gold Prince M. & M. Co., A. J. Welty in charge, and is considering erecting a 200-ton mill.—The Middlemarch mine, at Pearce, has repaired the mill machinery damaged by former employees, and its flotation mill is in operation again.

Silver Bell—El Tiro Mining Co. is installing a 250-kw. generator for the electric operation of pumps, blowers, haulage, and lighting systems. The company is shipping a carload of ore daily and reports large profits.

Miami—The Miami Mining & Milling Co.'s new mill at Doak station is complete. A 200-ton Blake crusher sends the ore to a Lane 50-ton mill, and thence it is delivered to plates and Wilfley tables. Tailings later will be treated by flotation, when the appropriate process is determined. A second mill section, with a battery of ten 1,000-lb. stamps, is already on the ground. The mill is at the portal of the 560-ft. tunnel that has cut four veins which are to feed the mill until the main vein is cut at 1,000 ft. Additional drill and compressor equipment is being installed. Ore said to sample $18 gold, with some lead.—The International Smelting Co. is operating two reverberatories, with its third under repair for an early resumption.

CALIFORNIA

SHASTA DISTRICT

Ingot—The Afterthought Copper Company completed installing of a reverberatory furnace during October. The furnace is now treating 135 tons of siliceous copper ore from the mines daily. A concentrate fairly high in copper, from the old Horwood plant, is being smelted with the copper ores, resulting in matte containing 18 to 20 per cent copper. The 300-ton oil flotation plant is ready to run, and will probably start up Nov. 15. A selective concentration of the copper and zinc will be made. The copper concentrate will be smelted in the reverberatory furnace; the zinc concentrate will be stored for future treatment. The company expects to install an electrolytic zinc plant in the near future.

Iron Mountain—The Hornet Mine is now making an average daily production of 400 tons of pyritic ore. The ore is marketed for its sulphur content to the General Chemical Co., and to the Standard Oil Co. Some of the ore is also used in the manufacture of fertilizer at the acid plant of the Mountain Copper Co., at Martinez.

TUOLUMNE—NEVADA—ALAMEDA COUNTIES

Stent—The ground around the Jumper mine has settled about six feet over an area approximating that of a city block. The engine and boiler works are situated in this sink. As a result of the condition of the ground, a new shaft may be necessary. It is understood that good paying ore is still in the mine.—The App mine has been unwatered by a raise from the lower workings of the Dutch mine. A large force of miners is engaged in timbering up the old App mine and in other repairs necessary by the long continued drowning of the workings.

Grass Valley—The Idaho-Maryland group, which recently suffered from flooding, has been unwatered to a depth of about 500 ft. by means of the air lift process. The shaft was found in poor condition below the 400 level, and much new timbering was necessary. Therefore no effort is being made further to lower the water until the first 500 ft. of the shaft has been repaired.

Livermore—The Western Magnesite Development Co. and other companies shipped the record quantity of 1,408 tons of magnesite from the Red Mountain district during October, 1919. Thirteen auto trucks were used.

Tule River Reservation—The lands of the Tule River Indian Reservation were thrown open to public entry on Nov. 1, 1919, under the act of June 30, 1919 (Public No. 3), authorizing location of mining claims on unallotted Indian lands. Since Nov. 1, fifteen mining claims have been located in the Cow Mountain section.

Porterville—The American Magnesite Co. has just been purchased by C. W. Hill, of Los Angeles and San Diego. A rotary kiln will be put in operation immediately on custom ore. Several sets of lessees are now operating on the property.

COLORADO.

Ouray—A. G. de Golyer, of Denver and Ouray, has taken over the Kentucky Giant at Ironton under the name of the Silver Hills Mines Co. He is erecting a large and convenient bunkhouse and putting in a compressor and complete mining plant, to ship ore this winter. He has announced that the Vernon Mining Co., nearby, will resume next spring, driving a long crosscut to develop at lower levels.—The American Smelting & Refining Co. has relinquished its option on the Revenue Tunnel group. A. E. Reynolds, of Denver, owner, is preparing to resume work on his own account. It is understood that development of the mine was not carried far enough and was not discouraging.—The Summit Copper Co. has taken over the Amazon group at Red Mountain, adding to its already considerable holdings and large ore reserve. Mill erection this fall was abandoned, but probably will be accomplished next spring.

Leadville—Work has been resumed at the A. V. mine, which was a heavy shipper of high-grade manganese ores during the war. It had been idle since July, and the owners are entering upon an extensive prospecting campaign in hope of finding high-grade silver-manganese ores. Work is being done by M. L. Buchanan. No new contracts have been obtained for the straight manganese ores.—John Cortellini and associates, of Leadville, have taken over several of the old properties in Adelaide Park. They are developing several old silver-lead properties that have been idle for a good many years. This portion of the Leadville district has been little prospected, and results are awaited with interest.—Lessees on the Cresentia property in California Gulch have opened up a good sized body of high-grade zinc ore on the 600 level. In the same vicinity, on the Shamus O'Brien and the Seneca, lessees are also mining zinc ore and prospecting the formations known to have been productive of high-grade silver ore in the old days.

Georgetown—Isabell, Plant & Co., of Toronto and Montreal, representing Canadian and British interests, have taken over silver-lead property known as the Sunburst Group. This property has been operated for the last three years by the Longeley Syndicate. A 3,200-ft. tunnel was driven, and the mine completely equipped by this company. A 100-ton aerial tramway 7,000 ft. long was also built, as well as a complete camp for accommodating forty men. The Longeley company expended $150,000 on this work.

MICHIGAN.

COPPER DISTRICT

Calumet—The Seneca Mining Co. is ready to ship copper ore to the Baltic mill, but is prohibited from doing so until the U. S. Railroad Administration determines what rate shall be charged for this important matter of hauling a few cars over a railroad that has been in business for thirty years. There is no precedent, the Seneca being a new mine and never having produced copper ore previously. The shaft is approaching the third level, which will be cut soon. Laterals on the second level are now opening 300 ft. of Kearsarge lode rock. A boiler has been installed and other surface equipment is being accumulated for unwatering the Gratiot property, recently purchased from the Calumet & Hecla.

Hancock—All parts for the Quincy Mining Co.'s new hoisting plant for No. 2 shaft are now on the ground, and erection is under way. The company has a large stock of unsmelted ore on hand.—The Hancock Consolidated has ten drills at work, eight in drifts on the vein east of the shaft and two on crosscuts to the vein. All work is being concentrated in opening ground that will be rich enough to permit profitable operations on a scale of more than 500 tons daily.

MENOMINEE RANGE

Iron River—Water is causing much trouble at the Rogers property. No ore is being mined. Pumps are handling 4,500 gal. per min., but with practically no lowering of the water level in the overburden. A concrete shaft was put down, but this did not end the trouble. A new program of drainage has been decided upon. The water is to be drained from the sand in specially constructed drifts in the rock, close up to the sand. Drifts will practically encircle the orebody and form a big drainage tunnel. At intervals raises will be driven and from these laterals will be run so as to increase the drainage area. The laterals will be close to the sand, but within the rock to guard against sand runs. From the back of the laterals, holes will be drilled into the sand to drain it. Water will follow the laterals to the raise, then to the drainage tunnel and back through the tunnel to a new sump. Electric pumps will send the water to surface. A year will be required to complete this program.

MISSOURI.

SOUTHEASTERN LEAD DISTRICT

Iron Mountain—The old Iron Mountain property, eighty miles south of St. Louis, Mo., which covers an old Spanish grant five miles square, has recently been sold to parties connected with the Mid-Co. Iron Company for $750,000. This property was purchased last spring by John Elledge, who continued a shaft that had been started on an old drill hole that was very promising and which was recently bottomed by Mr. Elledge in a fine body of high-grade specular hematite, that is associated with more or less mixed ore and porphyry. Mr. Elledge also reopened some of the old surface workings, with encouraging results. It now looks as though this property will have a new lease of life and produce a fair tonnage of high-grade ore, although it will be necessary to erect a concentrating mill. There are now three blast furnaces that will furnish a local market, and a 500-ton furnace is now being built at Granite City, Ill., which will greatly increase the local demand for iron ore.—The old Pilot Knob iron property, five miles south of Iron Mountain, is also being reopened and is making moderate shipments of low-grade phosphorus ore from a deposit that lies northeast of the old exhausted mine.

Annapolis—The Annapolis Lead Co. has begun work on a three-quarter mile railroad spur from the Missouri Pacific main line below Annapolis, and is preparing to sink a shaft to open up the body of disseminated lead ore found by diamond drilling. To date seventy-nine holes have been drilled. As soon as sinking is under way installation of a 500-ton mill will be started. D. G. Cook is president and A. J. Meier operating manager.

Flat River—The miners of the Federal Lead Co. at Flat River, recently went on a strike, but after two-weeks' lockout, they returned to work at the old rate of wages. The No. 12 shaft at Elvins, on the former property of the old Central Lead Co., is now producing 3,000 tons a day, which is being treated in the No. 3 mill.

Herculaneum—The Herculaneum Smelter of the St. Joseph Lead Co. is again operating, now on the open-shop plan, after locking out the union since last spring. The company's No. 16 shaft at Elvans, which is close to their No. 4 mill, is nearly completed and is expected soon to handle the output of the old mine at the River Mines and thus do away with delivering the ore from same by surface railroad. The Leadwood mine is still closed down, where the union has quite a stronghold, but is being kept unwatered. A slight advance has recently been made through the lead belt, which nearly restores the high rate that prevailed during the war.

The recently developed iron mine in Franklin County is partially supplying the local market with a high-grade hematite and some of the output is being shipped to Kentucky and Tennessee furnaces.

MONTANA

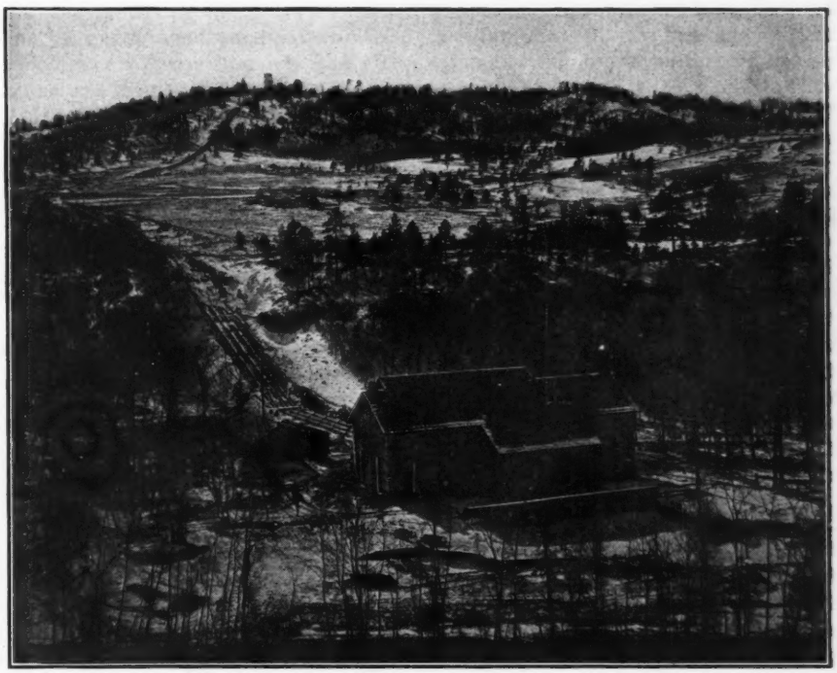
Butte—The Tuolumne Copper Co. has struck an orebody on the 1,000 level, the crosscut being in it on Nov. 17 for 24 ft., with the drills still in ore that runs high in silver and over 2 per cent in copper.—In October the North Butte company produced 2,019,421 lb. of copper, 81,940 oz. of silver, and 122 oz. of gold.

NEVADA

DIVIDE DISTRICT—ARROWHEAD

Divide—The new east-west vein recently found on Belcher Extension has been recently sampled by Andrew Walz in widths from 3 in. to 48 in., and 24 assays run, the results giving values in gold and silver of from $3.20 to $134.40 per ton. The vein was traced for 800 ft. on Belcher Extension ground and 300 ft. on the Belcher. Mr. Walz has recommended sinking a prospect shaft on vein near the Thompson Divide, where there is an unusually good showing.—The new shaft of the Tonopah Dividend Co. is down 50 ft. on what is thought to be the extension of the Caldwell vein of Divide Extension. A hoist is being installed.—Crosscutting by the Divide Extension Co. for the hanging-wall vein has been started from the 200-ft. point at the Caldwell shaft.—At a depth of 365 ft. the diamond drill which is prospecting the Hecla Divide encountered gold quartz of good grade.

Arrowhead—As a result of improved showing in the property of the Arrowhead Mines Co. there is much activity at this new camp which is seventy-six miles east of Tonopah and only a short distance from the road to Ely. On the 145-ft. level of the main property the showing is good, much high-grade ore being in sight. A townsite has been laid out and Leonard & Chapin, owners of the Ely "Record," are talking of starting a paper.



HOMESTAKE MINING CO.'S HYDRO-ELECTRIC PLANT NO. 1. WATER TAKEN FROM SPEARFISH CREEK, ABOVE SPEARFISH, S. D.

NEW MEXICO

Mogollon—There is not as much activity in the Mogollon district as might be expected with silver selling at its present price. The Mogollon Mines Co. is, however, operating at full capacity. It is reported that more ore was put through the mill last month than in any other one month in the history of the company. The profits were exceeded in only one month prior to last month. Besides ore from its own ground, this company is extracting ore from the Confidence ground to the east This ore is coming from the extension of the company's 500 and 700-ft. levels east into the Confidence ground. About 150 tons per day being put through the mill. Extractions run over 90 per cent. The Socorro Mines Co. is in the hands of a receiver. It is reported that plans are under way to reorganize this company, as there is considerable ore in sight in this property that will yield a good profit under the present price of silver. A large number of claims are held in the Dry Creek country southeast of Mogollon, and prospectors occasionally send in good assays, but no extensive work is going on there at present. The gold occurs as a telluride in these prospects.

SOUTH DAKOTA

BLACK HILLS DISTRICT

Lead—Flooding of the Homestake mine continues, and the water is approaching the 900 level. It will probably be necessary to flood to the 500 level. Diamond drilling and development of other ground away from the main workings is being continued.—At Galena, the New Silver Queen company has resumed work and is producing a good grade of lead-silver ore for shipment to the smelter.—At Maitland, the two-compartment shaft being sunk on the Echo property has reached the 200-ft. point, where a station will be cut and laterals driven. Sinking will be continued to 500 ft.

TEXAS

Freeport—All four units of the Freeport Sulphur Co.'s two steaming plants are operating steadily. Sulphur shipments by rail are being made regularly, but shipments by ocean freighters have been temporarily delayed by silting of the channel at the mouth of the Brazos River. Shipments will be resumed in a short time, when dredging is finished.

CANADA

BRITISH COLUMBIA

Alice Arm—A. J. T. Taylor, head of the Taylor Mining Co., that is operating the Dolly Varden mine at Alice Arm, together with two others interested in the company, has returned from a visit of inspection to the company's property. The season's work at the Dolly Varden mine, it is stated, has been satisfactory and shipments will probably be maintained throughout the winter. It is expected that the rate of output during October will be continued. At present a thousand-foot tunnel is being driven below the lowest workings. This should tap orebodies 250 ft. below the present tunnels. The statement is made that the Dolly Varden mine shipped 112,000 oz. of silver during September, and 150,000 oz. in October. The run of shipping ore is returning from 50 to 70 oz., although some sacked toward the end of the season is expected to run several hundred ounces.

The North Star group, adjacent to the Dolly Varden, has arranged to ship some sacked ore this year. The Tiger group and the Muskette, across the river, have developed some good showings, and will continue with development work through the winter, expecting to ship in the spring.

The Dolly Varden officials state that the railroad between tidewater and their mine has experienced no operating trouble so far this year, and the weather alone will determine the length of its winter operations. Up to the time of their departure there had been no snow at the mine.

MEXICO

GUANAJUATO DISTRICT

Guanajuato—The Pinguico Mines Co. has secured a lease and bond on the Esperanza group of claims at Santa Ana. This group consists of 197 acres on the Mother vein, about 2.5 miles northwest of the city of Guanajuato. Two shafts are at present being unwatered for the purpose of examination. Considerable work was done in the past on these properties, and it is expected that enough ore will be found to keep the San Prospero mill of the company operating for several years. The company is also examining the San Gregorio mine, twenty miles south of Guanajuato. In the event of satisfactory results it is proposed to move the Pinguico mill from Pinguico to the property.

La Luz—There is a project on foot to renew operations on a large scale at the Asuncion Company's properties in the La Luz district near the city of Guanajuato. The properties comprise 1,716 acres and consist of a number of mines opened up on two distinct vein systems. There are twenty shafts, and it is proposed to equip the mines so that 1,000 tons per day can be milled. Some of these mines have been large producers in the past and are among the most celebrated of the Guanajuato district.—The Peregrina mill of the Peregrina Mining & Milling Co. continues dropping sixty stamps, and is undertaking a vigorous prospecting campaign in the neighborhood of the Peregrina mine, having acquired for that purpose leases and bonds on a number of properties.—The fifteen-stamp mill of the United Mines Co. at the Melladito group of mines has been completed and is now in operation. This mill is constructed so as to increase capacity at a future date.

NORTHERN SONORA

El Progresso.—Although retarded somewhat during the last few weeks by the Yaqui Indian scare, which has gripped northern Sonora, operations at the property of El Progresso silver mining company have proceeded steadily and the mill recently completed is handling about 100 tons of ore daily by cyaniding and wet concentration. The company's offices recently removed from Nogales to Douglas, Ariz., and arrangements have been made to handle shipments of bullion and concentrates by truck from the mine 100 miles south of Nacozari, near Batuc. At Nacozari shipment is made by rail to the border at Douglas. The concentrates are to be shipped to the smeltery at El Paso and the cyanide precipitates to Perth Amboy, N. J., for refining. The principal values in the ore are in silver and gold, and the mine is known among mining men of Sonora as a former shipper of high-grade silver-gold ores.

The known ore resources of the property occur in five fissure veins traversing its holdings from end to end, paralleling one another. The mine is worked through two shafts, an old one now about 200 ft. in depth, with drifts on the first and second levels, which have opened up continuous oreshoots, the limits of which are unknown. However, about 50,000 tons of ore has been developed in the two drifts. A new double compartment, being sunk now, is below the 100-ft. level, being completely timbered to that point. It is equipped with a large hoist, headframe, and cage capable of carrying the working 500 ft. or more. It is the intention of the management to sink to the 500-ft. level, crosscutting at every 100 ft. to the various veins of the property, then drifting on the vein. Ore from the various dumps is hoisted by an incline track to the crusher level, but the collar of the new shaft is on a level with the crusher floor of the mill. Ores hoisted from the new shaft will be trammed by hand into the mill. The mill has been built on a steep hillside, all machinery being placed on concrete foundations. The Progresso company has available an abundance of good Mexican labor, with plenty of wood and water in the vicinity. A. Macfarlane is manager, and is assisted by five American department heads.

Mina Mexico—E. P. Ryan, manager of the Cusi Mining Co. and kindred interests in Chihuahua, is now at the Mina Mexico, forty miles east of El Progresso, making plans for re-opening the property. For more than four years, owing to revolutionary troubles, it has been idle. Mr. Ryan was unable to make a detailed statement of plans before completing his inspection, as no one connected with the management had visited Mina Mexico for between four and five years. Various rumors of theft of equipment and high-grading by natives have reached the outside world, but nothing definite was known. When the property was abandoned, about the time of Pancho Villa's raid from Chihuahua into Sonora, in 1915, there was a small smelter and a mill on the property, but whether these remained intact was not known. Mr. Ryan was of the opinion that it would be necessary to overhaul all equipment and probably to install a flotation mill.

Accompanying Mr. Ryan on the trip were C. B. Clyne, consulting engineer; J. J. McCleary, master mechanic, and J. S. Dickerson, chief electrician of the Cusi company, each of whom was to investigate the Mina Mexico from a technical standpoint. The natural route for shipping and receiving supplies at Mina Mexico always has been via Toniche, but the branch railroad of the Southern Pacific de Mexico from there to Torin having been destroyed by the Yaquis during the last three years, it will be necessary to ship hereafter via Batuc, where there is available the trucking road from El Progresso to Nacozari, from where shipment can be made to the border by the Nacozari railroad. Mr. Ryan's intention was to choose a route for a trucking road from the Mina Mexico to Batuc, should it exist, otherwise to use pack trains to that point and make arrangements for the freighting of the ore northward.

The opening of the Mina Mexico recalls the dramatic struggle to keep it open, approximately five years ago. Despite revolutionary and Indian troubles, which prevented freight from getting into that section for weeks and sometimes months at a time, every resource was strained to operate. When coke for the smelter ran short the then management of the property went so far as to have charcoal burned for use in the furnaces. It was not until the actual menace of Villa's anti-American followers hung over them that the Americans quit and came out.

THE MARKET REPORT

Daily and Weekly Metal and Mineral Prices, Metal Market Conditions, Average Monthly Prices, Stock Quotations

Silver and Sterling Exchange

Nov.	Sterling Exchange	Silver		Nov.	Sterling Exchange	Silver	
		New York, Cents	London, Pence			New York, Cents	London, Pence
13	412½	126⅞	69	17	408½	125¾	69
14	411½	124¾	68	18	406¾	127	70
15	410¼	124	67¾	19	404	127	70½

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Daily Prices of Metals in New York

Nov.	Copper	Tin	Lead		Zinc
	Electrolytic	Spot	N. Y.	St. L.	St. L.
13	20 @20¼	52¾@53	6.75@6.90	6.70@6.75	7.90@8.00
14	20 @20¼	52¾@52⅞	6.75@6.90	6.70@6.75	7.90@8.00
15	19⅞@20⅛	52¾@52⅞	6.75@6.90	6.70@6.75	7.90@8.00
17	19¾@20	52⅝@52⅞	6.75@6.85	6.70@6.75	7.80@7.90
18	19½@19¾	52⅝@52⅞	6.75@6.85	6.70@6.75	7.75@7.85
19	19⅜@19½	52½@52¾	6.75@6.85	6.70@6.75	7.75@7.85

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other special shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis. Tin is quoted on the basis of American tin, 99 per cent grade.

London

Nov.	Copper			Tin		Lead		Zinc	
	Standard		Electro-lytic						
	Spot	3 M.		Spot	3 M.	Spot	3 M.	Spot	3 M.
13	100½	102	112	281¾	283¼	34½	34¾	47¾	48¼
14	100½	101⅞	112	283½	284¾	34⅜	34⅝	47¾	48
15	....	....	....	....	....	....	....	....	....
17	99⅞	101¼	112	283¾	284¾	34¼	34¾	47¼	47¾
18	99	100¼	112	283¼	284¼	34⅜	34½	47	47½
19	97¾	99	111	282⅝	284	34½	34⅝	46¾	47¾

The above table gives the closing quotations on the London Metal Exchange. All prices are in pounds sterling per ton of 2,240 lb.

Monthly Average Prices

	September	October
Copper:		
Electrolytic, N. Y.	21.755c.	21.534c.
Standard, London	£100.767	£103.418
Lead:		
New York	6.108c.	6.487c.
St. Louis	5.853c.	6.249c.
London	£ 25.330	£28.473
Silver:		
New York	114.540c.	119.192c.
London	61.668d.	64.049d.
Tin:		
New York	54.482c.	54.377c.
London	£280.102	£279.239
Zinc:		
New York	7.510c.	7.823c.
St. Louis	7.160c.	7.473c.
London	£ 40.955	£43.630
Pig Iron:		
Bessemer, Pittsburgh	$29.35	$ 29.35
Basic, Pittsburgh	27.15	27.15
No. 2 foundry, Pittsburgh	28.15	28.30

Metal Markets

New York, Nov. 19, 1919.

Copper was weak in what was distinctly a buyers' market. Zinc, after an exhibition of strength in the early part of the week, experienced a relapse. Lead was strong, but was slightly easier.

Transatlantic freights were unchanged. Transpacific freights also were unchanged.

The British government's stocks of metals on Nov. 1, with the corresponding figures for Oct. 1 stated in parenthesis, were: Copper, 41,422,080 lb. (51,036,160); lead, 72,112 short tons (82,387); zinc, 29,444 short tons (32,831); aluminum, 20,950,720 lb. (22,408,960); nickel, 4,704,000 lb. (4,403,840); antimony, 3,584 short tons (3,696).

United States copper production in September, 1919, amounted to 108,703,075 lb., as compared with 107,994,040 lb. in August, 1919, and 157,992,487 lb. in September, 1918. Imports of copper ore and concentrates, and blister, during September, 1919, amounted to 35,634,562 lb.

Copper

At the close of our last market week it was clear that if any producer had an opportunity to dispose of a block of copper at 20c he would not let it go by. Before the end of the last calendar week business was actually done in million-pound lots at 20c, delivered. Some business was done at the same price on the following Monday, but before the end of Tuesday small producers accepted 19½c; and on Wednesday large producers were sellers at 19½c, delivered, which price was equivalent to 19⅜c at refinery. The volume of business, as reported to us, was larger than in the previous week. Some of it was apparently of speculative character. There was a good deal of irregularity in asking prices, for each seller was playing his own hand and the consumer who requested offers was likely to get them over a wide range. It was absolutely a buyer's market. The business that was done for export was very small.

Continuance of good business is reported by domestic wire-drawers and brass-makers, but, nevertheless, they evince no inclination to contract for copper.

Copper Sheets—31½c per lb. Wire 23½ f.o.b. factory, weak. Domestic buying dull.

Tin

The market seemed easier and somewhat irregular. Singapore quoted c.i.f., London, £282 on Nov. 13; £283½ on Nov. 14; £284 on Nov. 17; and £286 on Nov. 19. In this market Straits tin ranged from 53½ to 53c during the week.

Lead

A fair amount of business was done, with certain large producers still sellers at 6¾c, New York, though other producers got as high as 6.85c. There was a renewal of offers of small lots of lead from second hands which could be obtained around 6¾c. St. Louis market was steady at 6.70@6.75c, with business done at and between those figures.

Zinc

During the earlier part of the week a rather large volume of business was done at 7.90@8c, which included some buying for export to England and France and some buying by strong speculative interests. Domestic consumers were conspicuous by their absence. Rather free selling was encountered at this level, and upon the failure of the foreign demand to develop any further, speculative support was withdrawn and the market receded to about 7.80c.

The cargo of Australian zinc ore, to be followed by a second one, that will presently arrive in this country is no new development in trade, but is simply the delayed complication of one of the contracts of four years ago.

Zinc Sheets—$11.00 per 100 lb. since Nov. 14, less 8 per cent on carload lots.

Silver has continued to advance in London on short supplies, until it is now quoted at the highest rate on record, 70½d. This rise in London price has been affected here, however, by the falling rates for sterling exchange, which close at $4.04, the lowest point reached. The strength of the silver market, however, still continues to depend on the China demand, which continues unabated and at a premium over the London price.

The general stock of money in the United States on Nov. 1, 1919, totaled $7,721,561,106. Of this, $2,872,525,066 was in gold coin and bullion, $308,145,759 in standard silver dollars and $245,127,765 in subsidiary silver. The money in circulation on Nov. 1, 1919, was $5,816,925,779, or $54.63 per capita.

Mexican dollars at New York: Nov. 13, 99½; Nov. 14, 98½; Nov. 15, 97¾; Nov. 17, 99⅛; Nov. 18, 100¾; Nov. 19, 101½.

Platinum—Refined ingot was unchanged at $135 and strong at that.

Palladium—Unchanged at $120.

Aluminum—33c per lb.

Antimony—This market was strong and steady at 9¼c for spot, at which price a rather good volume of business was done. Futures were quoted at 9@9¼c, duty paid.

Bismuth—Unchanged at $2.96.

Cadmium—$1.40@$1.50.

Nickel—Ingot, 42c; shot, 43c; electrolytic, 45c.

Quicksilver—This market was a little easier. Business in prompt metal was done at $90 and metal to arrive was sold for $80. San Francisco telegraphed $82.50, steady.

Tungsten Ore—Only a small amount of business was done. Chinese wolframite, at $8.75@$10, and Western scheelite, at $15.

Molybdenum Ore—Quoted nominally at 75c per lb., but no busines reported.

Manganese Ore—Quoted nominally at 50c per unit, c.i.f., Atlantic ports.

Pyrites—Spanish pyrites is quoted at 17c per unit for furnace-size ore, free from fines, c.i.f., New York, or other Atlantic ports. Markets slow and unsettled.

Fluorspar—Lump ore containing 85 per cent CaF_2 and not over 5 per cent SiO_2 is quoted at $16, f.o.b. mines at Tonuco, N. M. Freight to Chicago $7.50; to New York $15.00. Prices quoted f.o.b. Kentucky and Illionis mines are $25 for washed gravel grade.

Zinc and Lead Ore Markets

Platteville, Wis., Nov. 15.—Blende, basis 60 per cent zinc, $50 per ton for Prime Western grade. Lead ore, basis 80 per cent lead, $82 per ton. Shipments reported for the week are 1,992 tons blende, 226 tons galena, and 360 tons sulphur ore. For the year to date the totals are 88,713 tons blende, 5,886 tons galena, and 17,471 tons sulphur ore. Shipped during week to separating plants, 2,335 tons blende.

Joplin, Mo., Nov. 15—Zinc blende, per ton, high $49.20; basis 60 per cent zinc, premium, $48.50; Prime Western, $47.50; fines and slimes, $45@42.50; calamine, basis 40 per cent zinc, $30. Average settling prices: Blende, $46.07; calamine, $34; all zinc ores, $45.83.

Lead, high, $86.37; basis 80 per cent lead, $88@85; average settling prices, all grades of lead, $86.37 per ton.

Shipments the week: Blende, 9,945; calamine, 191; lead, 1,134 tons. Value, all ores the week, $562,550.

The midweek metal market gave hopes of higher prices, and sellers were nearly certain the Prime Western price would be $50, but later metal declines left the week-end market unchanged.

Iron Trade Review

Pittsburgh—Nov. 18.

Though the striking coal miners have not returned to work, the steel mills have not thus far suffered from lack of coal, as their stocks have in the main proved ample, particularly as many of the mills have been operating under a sub-normal consumption, on account of the iron and steel strike. In exceptional cases the Railroad Administration, acting for the Fuel Administration, has released coal, as there was a large amount held, and there is now a fairly large production from non-union mines. The Connellsville region, for instance, is producing more than ever. About 3,000 cars are loaded with coal in railroad yards in the Youngstown district.

The iron and steel strike, now in its ninth week, is waning rapidly. Most of the mills in the Mahoning Valley are working fairly well. In the Wheeling district, a tour of the operating mills conducted by the Wheeling Chamber of Commerce for shopkeepers and representatives of the workmen has had beneficial results, by showing that other mills actually are operating. The Chicago and Gary mills are rapidly approaching normal operation.

The American Sheet & Tin Plate Co., as of Nov. 15, has opened its books for sheet and tin-plate contracts, for the first quarter of 1920 in the case of jobbers and for the first half in the case of manufacturing consumers, prices being precisely those of the Mar. 21 schedule. As previously noted, the Steel Corporation has been strongly opposed to price advances, and its October bookings of nearly a million tons, practically all for 1920 delivery, showed that it was carrying its principles out in actual practice. Many of the independents have strongly favored advancing prices.

Pig Iron—Though certain conservative interests making bessemer and basic iron were strongly in favor of holding prices at $27.25, Valley, and bessemer at $28.50, the market has got away from them, sales being made at $30, Valley, for 2,500 tons of basic iron, December to March delivery, and at $31.50, Valley, for about 2,000 tons of bessemer, approximately the same delivery, the iron in each case being for steel making, so that the business was distinguished from sales recently made of these grades as substitutes for foundry or malleable. Foundry iron has continued to advance, with sales at $34, Valley, though $33 might possibly be done. We quote the market advanced to the following: Bessemer, $31.50; basic, $30; malleable, $31@$32; foundry, $33@$34; forge, $31.50 f.o.b.

Valley furnaces, freight to Pittsburgh being $1.40. These prices average nearly $5 a ton above the Mar. 21 schedule.

Ferromanganese — The market has been quiet, with occasional sales of prompt domestic at $105@$110, delivered, English being sometimes available at $95@$100, Baltimore.

Steel—The Steel Corporation has covered regular customers some distance ahead at Mar. 21 prices, $38.50 for billets and $42 for sheet bars, but there is much unsatisfied demand, and the only open market offerings are at $3 to $4 a ton premium.

Coke—Coke operators expect to secure much higher prices on foundry and furnace coke on contracts for the first half of 1920 than they are receiving on contracts for the present half year, partly on account of scarcity and partly on account of increased costs due to the prospective wage advance, hinging on the settlement for the union coal mines, now under negotiation at Washington. One operator sold foundry coke for first half at $7, plus whatever increased cost may come from wage advances, and then withdrew. Some furnace coke is understood to be offered at $5.50, but most operators talk $6 or higher. The prompt market is about $6 for furnace at $7@$7.50 for foundry, per net ton at ovens.

Metal Market

New York, Nov. 26, 1919.

Further crumbling away in the price for copper, and a distinctly easier tone in the market for lead, were the distinguishing features of this week. Zinc experienced another sudden and sharp rally. Tin, after being erratic, advanced sharply, reflecting what appears to be the institution of a bull movement in London.

Transatlantic freight rates were unchanged. Transpacific rates declined, $12 being quoted from San Francisco to Hongkong and Kobe.

Copper

By the afternoon of Nov. 20 copper was available from nearly all quarters at 19c, and during the remainder of the week the bulk of the domestic business was done between 18½ and 19c. The market was more or less uncertain, some producers being suspected of selling on private terms and endeavoring to conceal their tracks, which gave rise to various rumors and gossip coming back into the market via buyers. At the close the situation seemed to be about like this: Consumers were willing to pay around 18⅞c., f.o.b. refinery, for delivery during the first quarter of 1920. Business had been accepted at 18¾, refinery, by producers for prompt delivery. Japanese buyers were reported as showing some interest in copper and willing to pay 18¼c. A lot of 200,000 lb. was sold on the Metal Exchange at 18¼c.

Small business was done through the week by the Export Association at slightly higher prices than prevailed in the domestic market. In the latter the buying was mainly by wire-drawers, but there was some by brass-makers. The brass-makers are reported to be feeling sore over the way in which the copper market has been allowed to go, and speak about signs of recession in their own business.

Tin

This market was erratic, reflecting what appears to be the institution of a bull speculation in London, the basis for which is supposed to be the theory that there will be shortage in the supplies from the Straits. It will be noted, however, that the Eastern market did not advance in anything like the same proportion as London.

Singapore quoted, c.i.f., London, £287 on Nov. 20; £288½ on Nov. 21 and 24; and £289 on Nov. 25. Quotation for Nov. 26 not received. In London, spot tin was £283 on Nov. 20; £284¾ on Nov. 21; £288¾ on Nov. 24; £290½ on Nov. 25; and £295¼ on Nov. 26. Sales on these days were 450, 500, 1,100, 900, and 650 tons respectively.

In the New York market prices rose in sympathy with London, that for Straits tin ruling about ½c per lb. above that for 99% brands. The advance in prices inspired the liquidation of some old bull accounts, but there was not induced any significant buying by consumers.

Lead

Reports were conflicting, some producers reporting important inquiry and the consummation of a good deal of business, while others reported just the reverse. Assembling all reports, however, it appears that a pretty fair tonnage was placed, but, on the whole, at slightly lower prices than in the previous week. The situation in lead has in fact become distinctly easier, which is ascribable to increasing production. This has been reflected emphatically in the St. Louis market, where some small producers have been shading prices, while today a large producer offered lead below 6.60c.

A rather fair export business was done with France, England, Sweden and South America.

Zinc

During the early part of the week the reaction went further under the influence of some large speculative

Silver and Sterling Exchange

Nov.	Sterling Exchange	Silver New York, Cents	Silver London, Pence	Nov.	Sterling Exchange	Silver New York, Cents	Silver London, Pence
20	400	132¾	71¼	24	406	136¼	75½
21	404¼	134	73½	25	406⅜	137½	76
22	404	135	74	26	404½	135	75⅜

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Daily Prices of Metals in New York

Nov.	Copper Electrolytic	Tin Spot	Lead N. Y.	Lead St. L.	Zinc St. L.
20	19 @19¼	52⅝	6.75@6.90	6.60@6.70	7.65@7.75
21	18½@19	52⅝	6.75@6.90	6.60@6.70	7.60@7.70
22	18½@19	52¾	6.75@6.90	6.60@6.70	7.65@7.75
24	18½@19	52¾@52⅞	6.75@6.85	6.60@6.65	7.80@7.90
25	18⅜@18⅝	53⅜	6.75@6.80	6.60@6.65	7.87½@8
26	18¼@18½	53¾	6.75@6.80	6.57½@6.62½	8

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other special shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis. Tin is quoted on the basis of American tin, 99 per cent grade.

London

Nov.	Copper Standard Spot	Copper Standard 3 M.	Copper Electrolytic	Tin Spot	Tin 3 M.	Lead Spot	Lead 3 M.	Zinc Spot	Zinc 3 M.
20	97¼	98½	111	283	284¾	35⅝	35⅝	46¾	47¼
21	98½	99¾	111	284¾	286¼	36⅜	36⅜	47	47½
22	....	....	....	....	....	....	....	....	....
24	98¾	100¼	111	288¾	290½	37	37	47½	48
25	97¼	98⅞	109	292½	294	36⅝	36¾	48	48½
26	95½	97	109	295¼	296¾	36⅜	36½	48	48½

The above table gives the closing quotations on the London Metal Exchange. All prices are in pounds sterling per ton of 2,240 lb.

offerings, but on Nov. 24 began one of the sharp recoveries that have been characteristic of this market recently. The last recovery followed upon considerable buying for export, together with some fair orders by domestic consumers. The houses that are buying for export continue to give preference to zinc available for delivery west of the river. This, together with position as to time of delivery, creates differentials in prices. At the close the market is quoted firmly on the average basis of 8c., St. Louis.

Antimony—This market was strong, with considerable business done. We quote spot at 9@9½c. and the same for futures.

Aluminum—Unchanged at 33c. per lb.

Palladium—Unchanged at $120.

Platinum—Refined ingot $135@$140.

Quicksilver — Business in prompt metal was done at $85@$88, and metal to arrive was quoted at $80@$85. San Francisco telegraphed $80 steady.

Tungsten Ore—Only a small amount of business was done. Lower grades of tungsten ore were quoted at $6.50@$7. Bolivian and South American ore at $10@$12 and Western scheelite, at $15.

Molybdenum Ore—Quoted nominally at 75c per lb., but no business reported.

Manganese Ore — Quoted nominally at 50@55c. per unit, c.i.f., Atlantic ports. There is a little more inquiry.

Copper Sheets—30c per lb. Wire 23c f.o.b. factory, weak. Domestic buying dull.

Zinc Sheets—$11.00 per 100 lb. since Nov. 14, less 8 per cent on carload lots.

Bismuth—Unchanged at $2.96.

Cadmium—$1.40@$1.45.

Nickel—Ingot, 42c; shot, 43c; electrolytic, 45c.

Silver—During the last week silver has advanced rapidly in London from the price on Nov. 20 of 71¼ to 76d. on Nov. 25. This figure is the highest price silver has attained in this spectacular advance. The London quotations have gone up chiefly from the fact that the amounts for sale in London have been limited and not equal to the demand. Then, in turn, the London price has stimulated Shanghai quotations. As a result of this combination, the official price in New York has moved up rapidly. The sharp advance in New York on Nov. 20, when the price here was materially influenced by the Oriental exchanges, also reflects the focusing of the Asiatic demand on New York and San Francisco, rather than on London; and it followed naturally after the restrictions put on the export of silver from London, as well as the curtailment of supplies from Mexico, owing to the attitude of the Mexican government. The future outlook of silver from this point is uncertain, as influences at work may create a reaction from current figures.

Mexican dollars at New York: Nov. 20, 102½; Nov. 21, 103⅛; Nov. 22, 103⅞; Nov. 24, 104⅞; Nov. 25, 105½; Nov. 26, 100¾.

Pyrites—Spanish pyrites is quoted at 17c per unit for furnace-size ore, free from fines, c.i.f., New York, or other Atlantic ports. Markets slow and unsettled.

Sulphur — Prices remain unchanged at $20 for export delivery and $18 for domestic delivery; per ton f.o.b. mines at Freeport, Tex., and Sulphur Mine, La. Shortage of labor and coal continues to prevent Sicilian mines from providing for European demand, and prevailing rates remain high on shipments from the United States.

Nitrate—Spot supplies are quoted at $2.97½ per cwt. for carload lots.

Fluorspar—Lump ore containing 85 per cent CaF_2 and not over 5 per cent SiO_2 is quoted at $16, f.o.b. mines at Tonuco, N. M. Freight to Chicago, $7.50; to New York, $15. Prices quoted f.o.b. Kentucky and Illinois mines are about $25 for washed gravel grade.

Graphite—Ceylon grades are quoted: Lump, 15@16c.; chip, 11@12c.; dust, 8@9c. The recent increase has been owing to the increase of premium on rupee exchange and higher freight rates.

Feldspar is quoted from $13.50 to $17 per ton, according to quality. Labor difficulties are hindering producers in increasing production.

Zinc and Lead Ore Markets

Joplin, Mo., Nov. 22.—Zinc blende, per ton, high, $49.80; basis 60 per cent zinc, premium, $46; Prime Western, $45; fines and slimes, $42.50@$40; calamine, basis 40 per cent zinc, $30. Average settling prices: Blende, $46.44; calamine, $32.45; all zinc ores, $46.45.

Lead, high, $88.30; basis 80 per cent lead, $85@$88; average settling price, all grades of lead, $87.23 per ton.

Shipments the week: Blende, 12,097; calamine, 80; lead, 1,130 tons. Value, all ores the week, $664,160.

Producers generally are now convinced there will be no stability to the ore market until international credits are established on a basis that will permit a free purchase of metals abroad. Representatives of Belgium smelters, who visited this district in the summer, expected to have an exchange basis permitting them to export ore from this district before the end of the year. Production continues strong, but some mines are down from lack of coal.

Platteville, Wis., Nov. 22 — Blende, basis 60 per cent zinc, $50.50 base for Prime Western grade; lead ore, basis 80 per cent lead, $85 per ton. Shipments reported for the week are 1,912 tons blende, 291 tons galena, and 175 tons sulphur ore. For the year to date the totals are: 90,625 tons blende, 6,177 tons galena, and 17,646 tons sulphur ore. During the week 2,759 tons blende was shipped to separating plants.

Iron Trade Review

Pittsburgh, Nov. 25.

The iron and steel strike has been crumbling fast in the last fortnight and is now nearly over. The coal strike continues, but the steel mills have not been hampered in operation, as they had considerable coal stocks, coal taken by the Fuel Administration just before the strike is being released in cases of necessity, and there is a fair volume of production from non-union mines.

The serious item for the steel industry now is not the strike, but the after-effects of the strike, with working forces disorganized and the necessity of training many new men, or old men in new jobs. Some mills made a rule against taking back strikers of certain nationalities or degrees of illiteracy. A long period is faced, perhaps six months, of production being much below capacity on account of the labor situation. As to the general labor shortage, the majority of manufacturers hold it will affect the iron and steel industry also, but a few claim that the wages paid are sufficient to attract enough men from the outside to man all the equipment that is to be operated, the training necessary being the chief restrictive influence.

Pig Iron—It is difficult to buy at prices quoted by conservative producers as the market, but the situation has not been thoroughly tested, as the call is chiefly for the early deliveries, and few if any producers would sell for late deliveries in any event. On this basis we quote: Bessemer, $31.50; basic, $30; malleable, $32@$33; foundry, $33@$34; forge, $31.50, f.o.b. Valley furnaces, $1.40 freight to Pittsburgh.

Ferromanganese — The market is stronger, and domestic producers may be able now to get their asking price of long standing, $110 delivered. Recently there were sales of 500 tons, 200 tons, and two lots of about 100 tons of English, to local consumers, at $100, Baltimore, but there are no regular offerings now at any price. Spiegeleisen is quotable still at $34@$35, furnace, but some makers are asking up to $45.

Steel—Premiums seem to be the rule for small lots of prompt, but leading producers are adhering to Mar. 21 prices with old customers,